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SUB-SAHARAN AFRICA'S OIL SECTOR:

SITUATION, DEVELOPMENTS AND PROSPECTS

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INTRODUCTION

1. In 1993, two-fifths of Africa's total exports of US$ 92 billion consisted of fuels. In the 49 countries in sub-Saharan Africa covered by the present study, one-third of export revenue came from fuels. Seven countries accounted for the major part of these revenues; the others are importers, generally spending more than one-quarter and in many cases more than one-third of their foreign exchange earnings on oil imports.

2. International oil markets are very complex. Oil prices are determined through an interplay of seemingly separate markets. Apart from physical markets, several types of financial markets have developed, giving all actors, irrespective of their size, a wide array of marketing, risk management and financing possibilities, ranging from the simple to the very complex.

3. The United Nations Conference on Trade and Development (UNCTAD) has worked on the marketing of commodities since its inception. Member governments *inter alia* decided at its Eighth Conference held in February 1992 in Cartagena, Colombia, that "developing countries should be provided with technical assistance and policy advice on mechanisms, such as the use of financial instruments, to manage price and other commodity-related risks".[1] In response to this resolution, the UNCTAD secretariat has developed a work programme which encompasses analysis, advice and training. The present study is part of this programme. In particular, it tries to clarify some of the practical and analytical aspects of oil marketing, risk management and structured finance. It was supported by the Government of the Netherlands through project TP-INT/93/A09. A major African oil conference in Harare in April 1996 was also made possible through this project, as well as an earlier study[2] and a manual on fuels price risk management.[3]

4. The present study analyses the oil sector in sub-Saharan Africa. The main aspects discussed are:

- principal production centres and production perspectives;

- the importance of oil in exporters' and importers' economies;

- the impact of oil price volatility on African economies;

- Africa's refining and distribution sectors;

- marketing systems and price formation in African countries.

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[1] *Cartagena Commitment* (TD/364), para. 205.

[2] UNCTAD, *Minerals and Fuel Price Risks in Southern Africa, and Possibilities for Risk Management* (UNCTAD/COM/69, 19 October 1995).

[3] UNCTAD, *Price Risk Management in the Fuels Sector: A Manual* (UNCTAD/COM/Misc. 100, October 1996).

5. The final section discusses the prospects for sub-Saharan African countries. It stresses the need to move from a static vision of marketing systems and procedures to a more dynamic vision, adapting to the changing market place; and it argues that this would allow these countries to benefit from, rather than suffer under, the greater complexity of the oil market which has emerged since the mid-1980s.

Chapter I

SUB-SAHARAN AFRICA IN THE WORLD OIL ECONOMY

A. Crude oil production

6. Africa's oil production started in Egypt in 1910, but most of its growth occurred from 1970 onwards. An average of 6.86 millions of barrels of crude oil is now produced daily, with which Africa accounts for one-tenth of world oil production. In Africa south of the Sahara (the region covered by this study), also called sub-Saharan Africa, oil production started at the end of the 1950s. Production became significant only in the early 1970s, when many new fields were put into exploitation. In 1976, crude oil production in sub-Saharan Africa was 123,242 MT,[4] or about 2,463,420 barrels a day (b/d). New discoveries and improvement in techniques allowed production to grow to 3.3 million b/d by 1995. Table 1 gives more details.

Table 1

Oil production in sub-Saharan Africa, 1976-1995
(1,000 MT)

	1976	1985	1990	1994	1995
Nigeria	100 860	74 627	86 544	102 099	101 671
Angola	8 000	11 452	23 553	26 142	31 025
Gabon	11 376	7 592	13 800	15 876	17 187
Congo	2 010	5 937	7 584	9 003	8 772
Cameroon	-	9 170	8 292	6 543	5 050
Zaire	996	1 270	1 441	1 214	1 516
Equatorial Guinea	-	-	-	270	345
Côte d'Ivoire	-	1 394	199	174	489
Benin	-	298	248	192	124
Total	123 242	111 740	141 661	161 513	166 179

Sources: COMTRADE database for 1976, 1985 and 1990; *Petroleum Economist* data for 1994 and 1995. *Petroleum Economist* figures are estimated differently from those of COMTRADE .

7. Five countries located along the Atlantic coast account for the major share of production. Nigeria, which produced its first oil in 1958, now accounts for over three-fifths of sub-Saharan Africa's crude oil production (see figure 1). It is not only Africa's largest producer, but also the sixth largest in the Organization of Petroleum Exporting Countries (OPEC).

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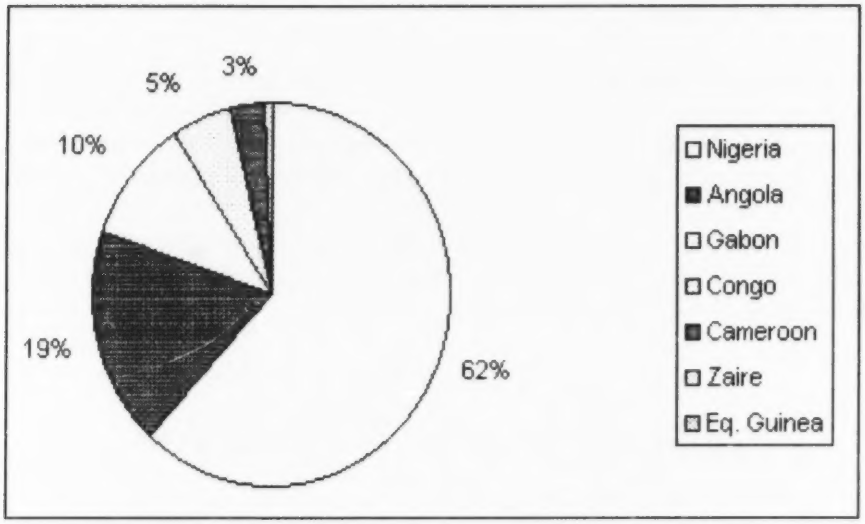
[4] One metric tonne (MT) is equal to 7.33 barrels of crude oil, each of 159 litres.

Figure 1

Distribution of crude oil production by country, 1995



8. Angola, currently producing about 700,000 b/d, has been the second-largest producer in sub-Saharan Africa since the mid-1980s. It started producing in 1968 in the Cabinda enclave, still the site of the country's major producing centre. A 20-year civil war, now officially over, destroyed much of the infrastructure of this high-potential country, but the oil sector seems to have suffered little.[5] As most production sites are offshore, they were relatively safe from UNITA attacks, thus allowing Angola's production to increase fourfold between 1983 and 1994.

9. Until the early 1980s, Gabon was sub-Saharan Africa's second-largest producer. Most production was offshore, until the exploitation of the Rabi-Kounga field started in January 1989. This field now accounts for about 60 per cent of the country's 320,000 b/d current output.

10. Congo, which overtook Cameroon[6] in 1992, is the fourth producer in the region with a production of 185,000 b/d against 119,600 b/d for Cameroon. Zaire and Equatorial Guinea[7] are also significant producers and exporters. Benin and Côte d'Ivoire operate small wells, but the

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[5] This does not imply, however, that there was no war damage; for example, in 1993 production declined by 25,000 b/d when UNITA troops destroyed onshore installations in the north of the country. Even one year later, production was not yet back to its former level.

[6] Cameroon's production is in free fall. It peaked at 9.16 million tonnes in 1985, but fell to 6.3 million tonnes in 1993 and less than 4 million tonnes in 1996. Exploration activities picked up only recently, and there have been no major new discoveries so far. Unless new fields are put into exploitation, it is not unlikely that Cameroon will stop exporting crude oil by the end of this century.

[7] Oil production in Equatorial Guinea only started in 1991. From 1,200 b/d in the beginning, it increased to 10,000 b/d in 1995. Oil has now become the country's major resource, accounting for a large share of GDP, government income and export earnings.

latter is striving to expand its oil production.

11. The evolution of crude oil production in sub-Saharan Africa in the last decade was linked to events in the international oil trade. In 1985-1986, oil prices fell as new producers entered the market with significant volumes; and African production consequently declined. This decline was also due to lack of investment and falling reserves in some countries. After the 1990-1991 Middle East crisis, production of crude oil increased by more than a quarter, with a large part of the increase coming from Angola. Nigeria and Gabon also increased their production.[8]

12. Sub-Saharan Africa's production is expected to increase in the second half of the 1990s, even though exploitation of some fields has been postponed or simply cancelled because profits were too low owing to low oil prices. This increase will be possible because, as discussed in box 1, some projects are likely to lead to rapidly expanding production. Apart from the countries discussed in box 1, Angola- with huge oil reserves -is also likely to expand production.[9]

13. Total proven reserves in sub-Saharan Africa today amount to over 30 billion barrels, representing more than 3 per cent of world reserves. This means that the current rate of production can be maintained for the next 30 years. Table 2 sets out the estimated reserves by country. It is important to note, however, that estimates of oil reserves are not just based on technical parameters, but are also influenced by a number of other factors, as discussed in box 2.

BOX 1

PRODUCTION PROSPECTS IN SUB-SAHARAN AFRICA

After Equatorial Guinea, Chad and Sudan are likely to join the ranks of Africa's oil exporters:

- In Chad, large oil reserves have been discovered in the Doba basin in the south of the country. It is estimated that they will allow a production of 220,000 to 230,000 b/d once put into exploitation in the early years of next century. Chad used to produce oil in the northern region of Sedigui (1,500 b/d in 1980), but production was halted because of the high costs of imports of spare parts, and the civil war which plagued the country for much of the 1980s.

- In Sudan, oil production started in 1994; and in 1995 reached a level of 40,000 b/d. According to the main company active in the country, the Arakis Energy Corporation (Canada), commercial production for exports will start soon. Production in 1996 is expected to reach 60,000 b/d, and the construction of a pipeline has been agreed on.

In a number of other countries, exploration is underway: Djibouti, Eritrea, Ghana, Guinea-Bissau and Senegal. However, for economic or political reasons, the fields discovered so far are unlikely to be exploited soon.

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[8] Nigeria has been a member of OPEC since 1971, and Gabon since 1975. OPEC has export quotas for its members; but during the Gulf crisis of 1990, countries were allowed to expand their production, filling the gaps left by the disappearance of exports from Kuwait and Iraq. Both Nigeria and Gabon benefited from this. However, Gabon's continuing membership of OPEC is not certain, as the country has not paid its contribution since 1994.

[9] However, production costs in sub-Saharan Africa remain high, partly because fields are smaller and deeper than in, say, the Middle East, and partly because infrastructural development costs are high. For example, to develop the same production capacity, it is necessary to drill many more wells in Nigeria than in the other large producing countries. Consequently, production costs are about 3.5 to 4 times as high as in the Middle East.

Table 2

Proven reserves at 1 January 1995
(in thousands of barrels)

	Reserves	Reserves/production ratio
Nigeria	19 800 000	27
Angola	5 412 212	22
Gabon	1 340 000	11
Chad	1 000 000	-
Congo	830 000	12
Cameroon	400 000	10
Sudan	1 400 000	-
Zaire	187 000	21
Côte d'Ivoire	50 000	-
South Africa	40 000	-
Benin	27 000	25
Eq. Guinea	12 000	6
Ghana	500	-
Total	30 798 712	25

Sources: Oil & Gas Journal, Marchés Tropicaux et Méditerranéens.

B. Types of crude produced in sub-Saharan Africa

14. Crude oils are not a homogeneous product. Various types of crude exist, differing in oil viscosity, density, gas content and sulphur content. Around 70 types of crude oil are available in the world (of which 27 are produced in sub-Saharan Africa) with 30 accounting for the bulk of trade. Three types are used as a price benchmark in the international oil trade: North Sea Brent, WTI (West Texas Intermediate), which is a basket of crudes produced in North America, and Dubai (which has superseded Arabian light).

15. In sub-Saharan Africa, crude generally has a low sulphur content, with grades ranging between average and light. In international trade, the prices of the crudes produced in this part of the world are usually referred to Brent 38 per cent API (American Petroleum Intermediate). Light crude is more in demand, because of the high proportion of "white products" (such as petrol, which has a relatively favourable value added) obtained in refining. Moreover, the technical structures required for processing light crudes are less costly than those for heavy ("black") products.

BOX 2

ESTIMATING OIL RESERVES

Estimation of oil reserves depends on a number of factors. Firstly, the relation between the cost of production and world prices at the time of estimation plays a mayor role. This cost is, to a large extent, a function of the size and depth of the reserves (as an indication, it ranges from US$ 0.5/barrel for a 1 billion barrel field at a depth of 2,000 metres, to US$ 6/barrel for a 100 million barrel reserve at a depth of 10,000 metres). Generally, exploitation of oil becomes worthwhile once its market price is at least double the cost of production.

Political considerations also play a role. Governments can, for example, underestimate the importance of reserves in conflict areas, or estimates are simply not available (for instance, this is the case in the south of Sudan). On the other hand, governments can be tempted to overestimate reserves in order to attract foreign investors.

Table 3

Main African crudes, in order of importance

Rank	Crude	Origin	Gravity in % API	Sulphur rate
1.	Forcados	Nigeria	31	0.2
2.	Bonny light	Nigeria	37	0.1
3.	Takula*	Angola	33	0.2
4.	Bonny medium	Nigeria	26	0.1
5.	Brass River	Nigeria	42	0.1
6.	Kolé	Cameroon	34	0.3
7.	Palanca	Angola	n.a.	n.a.
8.	Qua Iboe	Nigeria	37	0.1
9.	Djeno	Congo	28	0.2
10.	Molongo*	Angola	n.a.	n.a.
11.	Rabi	Gabon	34	0.1
12.	Escravos	Nigeria	36	0.1
13.	Mandji	Gabon	30	1.2
14.	Lokele	Gabon	n.a	n.a.
15.	Soyo Blend	Angola	34	0.2
16.	Anten	Nigeria	35	n.a.
17.	Pennington	Nigeria	36	0.1

Source: P. Horsnell and R. Mabro, *Oil Markets and Prices: The Brent Market and the Formation of World Oil Prices* (London: Oxford Institute for Energy Studies, 1993).

* Part of the Cabinda mix.

n.a. Data not available.

16. Nigerian crudes, such as Bonny lightand Fortuities, light and with a low sulphur content,[10] were for a long time the reference point for other African crudes. With the growth of Angolan production, however, the reference became Cabinda, which is a basket of three Angolan crudes (Takula, Molongo and Palanca). The principal crudes produced in the region and traded internationally are shown, in order of importance, in table 3.

C. Oil products consumption in sub-Saharan Africa

17. Sub-Saharan Africa (except South Africa) has a low level of industrialization, a low urbanization rate (an average of 25 per cent) and an intensive use of wood for energy generation.[11] Combined with the deep economic recession in which the majority of countries in the region finds themselves, this explains why the consumption of oil products, mainly used for transport, has remained stable over the past ten years. It is around 3 per cent of world oil consumption for a population representing 10 per cent of world population. According to a World Bank report, consumption per inhabitant is an average of 100 kilograms per year, which is less than half that of India.

18. However, this average conceals some disparities. The Seychelles have the highest consumption, with 2,235 kg in 1990.[12] Zimbabwe, a country with a huge manufacturing sector and the most important and diversified economy in the sub-Saharan region after South Africa, consumes only around 157 kg per capita. At the lower end of the scale, countries such as Burkina Faso, Burundi, Ethiopia and Malawi had a consumption of less than 20 kg per capita in 1990.

[10] While the production costs of Nigerian crudes are high compared with other OPEC countries, their prices are also relatively high. For example, when price differentials were still fixed by the OPEC exporters, Bonny light was quoted at US$ 1.92/barrel over than Arabian light.

[11] However, oil accounts for approximately 85 per cent of commercial energy use in the region, with the lowest percentage (50 per cent) being in Southern Africa, where coal is also important.

[12] This percentage is so high because the Seychelles are a major transit and fuel recharging point for both military and civil aeroplanes and ships.

19. South Africa has an energy consumption of 657 kg per inhabitant, the second highest in the region. Hit by international sanctions until 1993 because of its apartheid policy, the country has developed a carbo-chemical industry unique in the world. Because of this, a third of its final total of energy consumed in 1993 was generated by coal, a product of which South Africa has the world's fifth-largest reserves. In 1993, the share of oil products (including synthetic oil[13]) in final energy consumption was only 36.5 per cent, representing 15.51 million tonnes (oil equivalent). Despite the existence of an important and diversified industrial sector, oil products such as petrol and diesel (83 per cent of total oil products consumption) are essentially used for transport, as is the case all over the subcontinent.

20. According to UNCTAD data, Africa consumes the equivalent of 37 per cent of its total oil production. In the main crude oil producing countries in sub-Saharan Africa, the consumption rate is inversely proportional to their production volume (except Nigeria, which consumes an average of 15 per cent of production). Rates vary between 17 per cent in Zaire and 5 per cent in Gabon. At times, these would appear to be quite high in relation to these countries' industrial level, thus casting doubt on the reliability of export data.

D. Exports

D.1 Exports of crude oil

21. More than 90 per cent of oil produced in the region is exported in crude form, because of a weakness in sub-Saharan Africa's refinery structure (except in South Africa), as will be discussed in chapter III. Sub-Saharan Africa's crude oil exports represent an average of 4 per cent of world exports over the past years, a share almost equivalent to that of the Islamic Republic of Iran or less than half that of Saudi Arabia. The evolution of crude oil exports since the beginning of the 1980s is shown in table 4.

Table 4

Evolution of crude exports
(in barrels/day)

	1980	1990	1991	1992	1993	1994	1995
Nigeria	1 952 160	1 550 000	1 598 080	1 573 280	1 545 480	1 880 000	1 890 000
Angola	110 140	438 900	474 840	489 440	465 020	530 000	630 000
Gabon	153 740	249 300	277 380	271 900	296 220	335 000	355 000
Congo	68 420	150 040	146 500	147 380	157 640	195 000	185 000
Cameroon	32 240	144 620	138 020	123 060	100 500	115 000	105 000
Zaire	17 060	24 200	28 940	29 520	27 700	25 000	27 000

Source: COMTRADE database, BP Statistical Revue, Energy Statistics Sources Book

[13] Synthetic (coal-based) petrol accounts for 46 per cent of national petrol sales.

22. Two-thirds of the crude oil produced in sub-Saharan Africa is exported to the large concentration of refineries on the Gulf Coast of the United States. For Nigeria, 55 per cent of the crude produced, and four-fifths of NNPC's share in national production, are exported to this region.

23. The structure of exports of the crude oil producing countries in the region reveals a growing dependence on oil (see table 5). This is particularly the case in Nigeria, Angola and Congo, where since the early 1980s oil exports, in terms of value, have represented four-fifths of national export earnings. Gabon is also highly oil-dependent, with oil accounting for two thirds of total exports in value. Cameroon's dependence on oil is decreasing; this is mainly because of the slowdown in production since 1991, due to the fact proven reserves are running out. In Zaire, oil exports have constantly increased since production started.

Table 5

Share of oil exports in total exports, in per cent
1970 - 1994

Year	1970	73	74	80	84	86	90	91	92	93	94
Nigeria	57	83	92	92	97	106*	92	95	94	90	95
Angola	11	29	49	74	86	87	89	90	82	95	95
Gabon	41	42	67	80	72	53	77	73	70	77	72
Congo	0.7	31	84	94	92	72	109*	90	87	83	86
Cameroon	-	-	-	29	26	21	51	49	46	38	43
Zaire	-	-	-	-	22	10	20	26	52	49	41
Equatorial Guinea	-	-	-	-	-	-	-	-	-	45	47

Source: Calculated on the basis of COMTRADE data, Petroleum Economist.
* Because of the way data are collected, total export figures sometimes do not correspond to the total of the individual exports of commodities and manufactures.

D.2 Oil products exports

24. Oil products exports remain less important than exports of crude. In value (excluding those of South Africa), they represented -in 1993- 7 per cent of sub-Saharan Africa's crude oil exports. This percentage, which stood at 3 per cent in 1980, peaked at more than 9 per cent in 1986. These exports are mainly for the countries in the region.[14] Nigeria, Côte d'Ivoire,[15]

[14] Although fuel is also exported to, in particular, the United States.

Kenya[16] and Senegal[17] export the major part of these oil products, largely because of their relatively efficient refining structures. South Africa has the most important refining structure in the region, as will be discussed in chapter III. Its exports are destined primarily for the markets of Southern and Eastern Africa, India and the Atlantic coast.

E. Imports

E.1 Crude imports

25. Sub-Saharan Africa imported more than 18 million metric tonnes of crude oil in 1993, representing 1.2 per cent of world crude imports, or equivalent to one-seventh of its crude oil exports. With some 12 million tonnes of crude oil officially imported every year, South Africa accounts for more than two-thirds of total regional crude oil imports. Its crude imports come mainly from the Middle East.[18] Generally, East African countries also import their crude from the Middle East, except Eritrea, which still imports its crude from Russia. The other countries import part or all of the crude they need for their refineries from other producing countries in the region, particularly Nigeria, Gabon and Algeria.

26. After South Africa, the main importers of crude oil are Kenya, Côte d'Ivoire, Ghana and Sudan. However, problems with their refineries, coupled with a lack of foreign exchange, have led to a decline in these countries' crude imports and to a consequent increase in the import of refined products.

E.2 Oil products imports

27. Sub-Saharan Africa imports very few oil products: imports represented in value only 1 per cent of world oil products imports in 1993. As noted above, many countries with a refinery structure have increased their imports of oil products over the past year, reflecting the frequently poor performance of their refineries (refining is often at a loss).

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[15] Côte d'Ivoire's refinery is able to produce significant amounts of "white products", unlike to virtually all other refineries in West Africa, and is thus able to supply these products to neighbouring countries and other countries in the region, such as Namibia.

[16] Refined products account for about 12 per cent of Kenya's total exports. These exports are declining, largely as a result of a decline in the volume of exports. This in turn is due to the stagnation of the processing capacity of Mombasa's KPRL refinery, and to maintenance problems.

[17] Fuel exports account for 11 per cent of Senegal's total exports, most of which consists of bunker fuel (Dakar has an important port) and aviation fuel for the aeroplanes landing at the country's airport, although small amounts are also exported to neighbouring countries.

[18] In response to the oil boycott during the apartheid years, South Africa built up large petroleum reserves, and imports remained at over 100 million barrels a year, despite the boycott. Part of these reserves, worth 1.5 billion rands, have recently been sold to support the country's socio-economic development programme and the Mossgaz synthetic fuel company. Between 50 and 60 million barrels remain in store, at a high cost (estimated at US$ 3.5/barrel/year). As the oil market is in backwardation, and a new boycott of South Africa would appear extremely unlikely, this seems an extremely expensive way to secure the country's crude oil supply (the purchase of futures contracts would be much cheaper).

28. Several countries in the region have unregistered imports of oil products (see box 3). This illegal trade mainly results from a lack of coordination of monetary and fiscal policies in neighbouring countries, which leads to large price differences. Even in the same monetary zone, smuggling exists. For example in Côte d'Ivoire, some refined products officially destined for export to Mali, Burkina Faso and Guinea (and thus tax-free) are in reality sold on the domestic market.

29. The distance between the countries in the region is small, and one would thus expect transport costs for regional purchases to be low compared with the costs of imports from Mediterranean, Caribbean or Middle East refineries. However, an absence of economies of scale, and a poor overland transport infrastructure, cancel out most of this comparative advantage.

BOX 3

THE PROBLEM OF SMUGGLING

Illegal imports of petroleum products are substantial in many sub-Saharan African countries, thus lessening the value of official statistics. Illegal exports from Nigeria alone are estimated at one-sixth of that country's refined products production, or over 50,000 b/d. These exports are to all neighbouring countries, and are thought to account, for example, for 15 per cent of Cameroon's oil consumption.

Congo is the destination of oil smuggled from Angola, estimated at some 6,000 barrels a month. This costs the Congolese State around 140 million CFA francs in forgone tax revenue.

In Uganda, illegal imports from Kenya at times account for one-third of local consumption. In some Sahel countries (Mali, Niger and Chad) a substantial quality of petroleum products is smuggled in from Algeria and Libya.

Nevertheless, the devaluation of the CFA franc, the increase in petroleum product prices in Nigeria (petrol prices increased by around 250 per cent in October 1994) and increasingly efficient intervention by the customs authorities of various countries seem to have led to a decline in oil smuggling during the past two years.

Chapter II

THE IMPORTANCE OF OIL TRADE IN NATIONAL ECONOMIES

A. Share of GDP

30. The 49 countries comprising sub-Saharan Africa have diverse economies. However, most have a low Gross Domestic Product (GDP), and with the exception of the seven exporters, a pronounced dependency as regards the import of oil products (table 6). Even countries with refineries import an increasing quantity of refined oil. Moreover, even more in oil producing countries[19] than elsewhere, oil products are used as a tax base, representing some 40 per cent of indirect taxes in the region.[20] Paradoxically, in many producing countries, while oil exports serve as a source of taxation, local consumption is subsidized.[21]

Table 6

Importance of oil trade in national economies
(data for 1993 or the latest available year)

	% share of oil sector in GDP	% of oil revenues in government income	% of oil exports in total exports
Nigeria	32	75 (1994)	90
Angola	35	60 (1991)	95
Gabon	31	46	77
Congo	37	51 (1992)	83
Cameroon	7	29	39
Equatorial Guinea	20	12	45
Zaire	16	46	49

[19] Governments collect taxes from the co-producing companies.

[20] Petroleum Industry Data Sheets, Note No. 17, World Bank, September 1992.

[21] Fuel consumption is subsidized in both exporting and importing countries. Pump prices often fail to react to world market price increases, with the government absorbing the loss. In other cases, the subsidy is indirect:
- Fuels may be sold at market prices to public transport companies, but ticket prices are then set at such a low level that the government needs to provide financial support to cover exploitation costs.
- The domestic price may be a function of international prices, but calculated at official (overvalued) exchange rates; for example, in Nigeria the official rate of 22 nairas = US$ 1 was used in April 1996, while the market rate was 82 nairas to the US dollar.

31. Every year, oil exports provide more than US$ 18 billion to the countries of sub-Saharan Africa. Oil accounts for one-third of GDP in the four main crude oil exporting countries. Angola and Nigeria depend on oil for more than 90 per cent of their exports. In Congo, exports of oil account for more than four-fifths of total exports, and for 37 per cent of GDP. In Equatorial Guinea, most of the 15 per cent GDP growth in 1992 was due to the start-up of oil production. In Zaire, the oil economy is equally large, although it should be noted that it is an enclave, without real impact on the national economy (all oil revenue is held in an overseas escrow account, partly to reassure foreign companies investing in the sector and to secure the import of oil products). In Cameroon, the decline in oil production was reflected in a decline in the importance of oil in GDP from one-third in the mid-1980s to around 7 per cent in 1993.

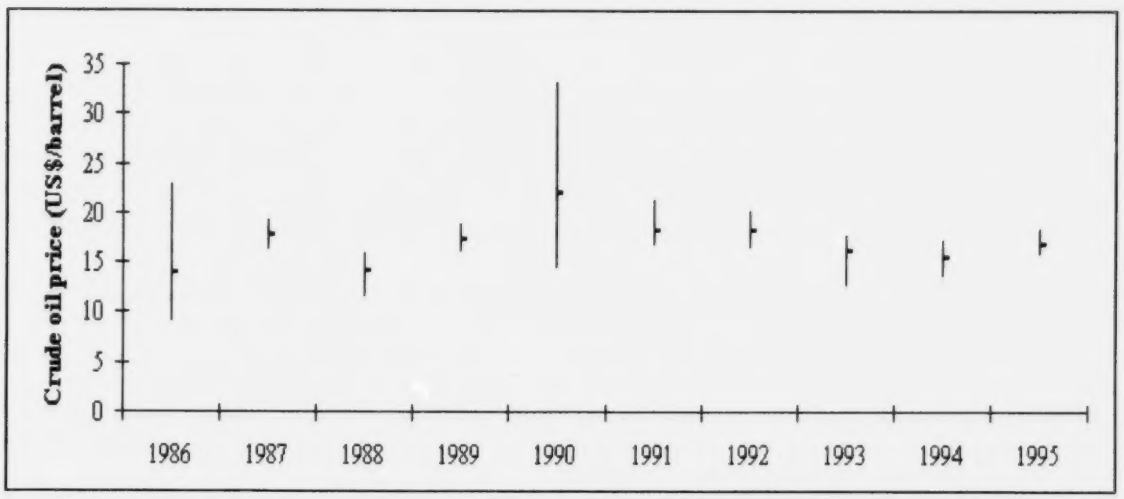
32. The fiscal policies of the countries of the region vary considerably. In many countries, oil taxes are very important for government income. For instance, in Guinea-Bissau annual oil taxes are US$ 55 million, accounting for 93 per cent of indirect government taxes (IGT). In Mali, these figures are respectively US$ 86 million and 74 per cent of IGT; and in Burkina Faso, US$ 72 million and 69 per cent of IGT. For other countries, oil taxes are of little importance; for example, in Lesotho, they are only US$ 9 million and 7 per cent of IGT.

B. Price instability, and its impact on oil export revenues and oil import costs

33. As can be seen in figure 2, oil prices over the past ten years have fluctuated greatly. In two years (1986 and 1990), prices varied considerably, and even in years of relatively stable prices, the year's lowest average monthly price was generally as much as US$ 5 below that of the month with the highest prices. Considering the quantities involved, this translates into significant values.

Figure 2

Evolution of crude oil prices, 1986-1995:
Monthly lowest, highest and average price



34. These movements characterizing oil markets affect the economies of both exporting and importing countries. In exporting countries, investment projects, which are often ambitious, are usually based on high oil price expectations; when the prices actually received are lower than expected, governments must drastically adjust their plans, and this results in additional costs (see box 4). In Nigeria, for instance, a decrease of US$ 1 in the crude oil price means a daily loss for the country share of about US$ 800,000, or more than US$ 300 million a year. In Angola, these figures are respectively US$ 357,000 and more than US$ 130 million. This type of unexpected revenue loss can put a great deal of pressure on balance of payments, and has resulted in an increase in the level of indebtedness.[22]

35. Oil importing countries have to use a significant part of their export revenue to purchase oil products. Consequently, they are highly exposed to rising oil prices. The most extreme case is that of Mozambique, where oil imports in 1990 represented 12 per cent of total imports, equivalent in terms of value to 81 per cent of total exports.

BOX 4

THE CONSEQUENCES OF THE 1986 OIL PRICE FALL

In the late 1970s and the early 1980s, high oil export earnings allowed exporters to vastly expand their budgets, and initiate ambitious investment programmes, without the need to rely on external borrowing.

For instance, in Congo, the Government was able to increase its expenditures seventeen-fold between 1978 and 1983; and there were similar increases in the other African oil exporting countries. However, when oil prices fell in 1986, governments had difficulties in adapting. In Nigeria, export earnings fell by 46 per cent, or almost US$ 5 billion, from 1985 to 1986. Gabon saw its export receipts halved, and its government earnings decline by one-quarter (it cut expenditures, but only by 10 per cent, leaving a large fiscal deficit). In Cameroon, the decline in oil export earnings caused external debt to increase by more than a quarter.

Although all countries took drastic measures to cut back government spending, governments did not manage to bring their accounts into balance. Current account deficits and foreign lending continued to increase, and all countries fell into a deep economic crisis, which in some cases lingers on.

36. Other factors make oil price increases even more difficult for many African countries. The difficulties in reducing the volume of imports of oil products without substantially impacting on the rest of industrial activities, combined with an increase in transport costs to and from the world market (an important factor for landlocked countries[23]), can cause considerable problems for these countries. For a country such as Tanzania, an increase in the price of oil by US$ 1/barrel implies an extra import cost of more than US$ 8 million from one year to another.

37. A recent example of the impact of oil prices on importing countries was the price increase

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[22] This is particularly the case in Nigeria, where NNPC owed its international partners between US$ 350 million (according to NNPC) and US$ 500 million (according to the international companies) at the end of 1994. This compares with only US$ 20.6 million in November 1993.

[23] In Rwanda and Burundi, for example, transport accounts for one-third of total oil import costs.

resulting from the Gulf crisis in 1990-1991. The majority of countries in sub-Saharan Africa suffered greatly under this increase: some saw their oil import bill more than triple. This increased domestic prices in Zambia, for example, by more than 350 per cent.

C. Oil reserves: An advantage or a burden?

38. In sub-Saharan Africa, the economic performance of oil exporting countries does not seem to be better than that of those without any oil assets. A comparison of growth rates of oil exporting countries with those of countries with a high dependence on other commodities shows no great difference. Moreover, the growth rates of oil exporting countries did not fundamentally change after their oil exports started, compared with the period before.

39. Several factors may explain this situation. First, the gross returns on oil exploration may be large, but net benefits are much smaller. The initial investment costs are very high,[24] and most developing countries do not have the internal capital markets to raise the amounts of finance necessary; thus, they have to rely on foreign funding. Moreover, development and production are complicated activities, and foreign equipment and personnel are needed. For these reasons, especially in the first year of production, debt service, payments for foreign workers or expertise, and imports of essential equipment and spare parts can weigh heavily on earnings.

40. The second factor is that the oil industry can have direct negative effects on other industrial activities. The salaries offered in the industry are generally more attractive than anywhere else, causing a brain drain to the detriment of other productive sectors as well as the public sector. At the same time, the oil industry is likely to benefit from more attention from the government, thus causing a certain neglect of the rest of the economy.

41. Lastly, the earnings from oil exploitation are inherently very difficult to manage. For governments, not using all the revenues from the oil sector is politically difficult to explain. This, together with excessively optimistic price expectations, can lead to overambitious investment programmes which, in years with low export earnings, can weigh heavily on government budgets.[25] Oil revenues also increase foreign currency earnings, and may thus lead to an increase in demand for the conversion of this currency into the domestic one. This can lead to a local currency revaluation, causing other exports to become less competitive (the "Dutch disease" effect).

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[24] For example, in Benin, drilling one extra well which increased crude oil production by 13 per cent from 1984 to 1985 (production started in 1982) cost US$ 120 million .

[25] The external debt of sub-Saharan Africa increased from 96 per cent of exports in 1980 to 362 per cent of exports in 1989, while debt service increased from 18 to 26 per cent. In some countries, the debt service ratio is much higher. In 1995, debt service accounted for almost 70 per cent of Nigeria's oil export earnings, and for 60 per cent of those of Congo. The heavy debt of oil exploring countries is often due to erroneous forecasts, assuming stable production and increasing prices on the earnings side, and underestimating investment and maintenance costs for infrastructural projects (which governments tend to finish even if this is not economically justifiable).

D. Is better management of oil earnings possible?

42. Oil wealth is difficult to manage. The principal difficulty is the uncertainty in the level of oil revenues. The best solution is the management of these earnings in such a way that fluctuations in international prices are absorbed. There are several techniques for this.

43. First, an exporting country could better coordinate its revenues and its expenses. Since oil trade is conducted in US dollars, debt could for instance be denominated in US dollars, when oil revenue is used to reimburse debt. Financial markets allow such a possibility, and also enable a direct link between debt service and oil prices through the use of commodity bonds, in which the interest rate (and/or the principal) is denominated in quantity of oil. An oil importing country could also link its import expenses and its earnings from major exports.

44. Second, a country could use market-based instruments (derivatives), including futures contracts, options or swaps, to directly manage price risk.[26] These financial instruments make it possible to lock in a (minimum) price to be received or to be paid during a period of up to several years. More active possibilities, which, at some risk, can make it possible to benefit from price fluctuations or anomalies in the pricing structure,[27] also exist. The main difficulty with these strategies for the countries in the region may be that of gaining access to sufficiently high credit lines; but these problems can be overcome through the use of structured financing techniques. Countries also need to overcome institutional barriers by initiating policy and administrative reforms, including allowing state enterprises to use the modern markets just mentioned.

45. Third, a country could use stabilization funds - an easier option for an exporting country than for an importer. Such a fund stabilizes export revenues: in periods of high prices, a part of revenue goes into this fund and, when prices fall, the resources thus accumulated are used for compensation. However, a stabilization fund has some disadvantages, as discussed in box 5. Lastly, and perhaps the most practical of all, a stabilization fund can be used in combination with derivatives.

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[26] S. Claessens and R. Duncan, *Managing Commodity Price Risks in Developing Countries* (Washington, D.C.: World Bank, 1994).

[27] This has happened, for example, with Duke Oil, NNPC's trading company in London. According to market sources, Duke Oil multiplied its initial investment by over 400 times through successful arbitrage activities on the commodity futures market. However, the company was provisionaly closed for political reasons, relating to a mistrust of transactions on futures markets.

BOX 5

STABILIZATION FUNDS

(i) Some developing countries have used a stabilization fund to manage their external risks. Limited access to international financial markets, the existence of basis risks regarding futures prices and/or a lack of knowledge of modern financial markets explain in many cases the preference for a stabilization fund.

(ii) Such a fund is credited with part of the surplus earnings which exist when world market prices are high; and these funds are then used to offset earnings shortfalls in terms of low prices. This is basically a self-insurance scheme, but for countries where funds are scarce, it may be doubted whether this is the most efficient use of resources.

BOX 6
The Chilean Copper Stabilization Fund

The Chilean Copper Stabilization Fund (CSF) was created in 1985 as part of Chile's structural adjustment programme, in cooperation with the World Bank. It was set up to stabilize export earnings by using offshore foreign exchange reserves to absorb cyclical earnings fluctuations. The surplus earnings of Codelco, the parastatal copper company, are placed in a Central Bank account, and a part of these funds can be used in the case of export earnings shortfalls. To determine surplus earnings, a price band was established around a reference price. If prices are above this price band, a part of surplus earnings is deposited in the CSF; if they are below, a withdrawal is possible.

(iii) Some examples of stabilization funds are Chile's copper fund (box 6), the funds used by a number of Pacific islands (box 7), Colombia's coffee fund and the fund used by Oman for crude oil.

BOX 7
Pacific island trust funds

Several countries in the Pacific operate public trust funds. The Papua New Guinea trust fund is based on mineral exports and; the Kiribati and Nauru funds on the exports of phosphates. The Tuvalu trust fund was created through donor contributions. In each of these countries, the principal purpose is to improve financial stability, and to insulate national development from earnings fluctuations. Apart from the Papua New Guinea fund, the funds invest most of their earnings abroad as a way of stabilizing the balance of payments.

The resources of these funds are not always used in an efficient manner. In the past, if income increased, e.g. following an export price increase, consumption expenditures also increased. Especially in the case of Papua New Guinea, the fund, rather than acting as a stabilization fund, was used to transfer resources from one sector to another. Thus, even in these relatively small economies, the proper management of stabilization funds has been very difficult.

(iv) Stabilization funds are difficult to use. The first problem is technical: how does one determine how much money needs to be deposited in the fund, and how much can be used? Two systems frequently used both utilize automatic decision-making. Under the first, fixed reference prices are determined. For example, in the case of Oman, if the oil price is between US$ 18 and 20/barrel, 7.5 per cent of net revenues are deposited in a special fund; and this percentage increases proportionally to reach 100 per cent of incremental earnings for any price over US$ 25/barrel. The funds thus accumulated can be used if prices fall below US$ 18/barrel. Under the second system, payment flows are determined on the basis of past prices. For example, if the average price of the current month is 10 per cent higher than that of the previous six months, half of the additional revenue is saved. In both systems, the major difficulty is how to determine adequate percentages.

BOX 5 (continued)

The efficiency of a stabilization fund could be increased if forecast prices, rather than past prices, are used. One possibility is to use futures market prices.

(v) The second problem is political. How can one justify funds remaining untouched when a country is so poor and there are so many possible uses for the money? Automatically, large stabilization funds come under strong political pressure. Unfortunately, oil earnings stabilization funds can only be sustainable if they are very large, taking into account the extreme fluctuations in prices. Economic necessity and political reality seem sometimes incompatible.

(vi) A solution allowing a country to stabilize oil exports revenue and government income without using a huge fund does exist, namely the combination of a modest stabilization fund and use of the financial instruments available in risk management markets.

(vii) Over time, crude oil prices are distributed asymmetrically. Importers face the problem of price peaks, while exporters need to worry about prices that are depressed over longer periods. Prices are hardly at what could be considered a long-term equilibrium level. This causes major risks, and this in turn makes a very large stabilization fund necessary if the fund is to survive over a longer period. The use of market-based instruments such as options enables some of these risks to be externalized. When using these instruments, a stabilization fund, even of reduced size, can survive over a long period. Moreover, such a hybrid fund can easily be used as collateral in structured finance transactions, thus allowing access to low-interest loans or easy access to long-term risk management markets.

* A practical example is discussed in S. Claessens and P. Varangis, *Oil Price Instability, Hedging, and an Oil Stabilization Fund - the Case of Venezuela*, Policy Research Working Paper No. 1290 (Washington, D.C.: World Bank, April 1994).

Chapter III

SUB-SAHARAN AFRICA'S OIL INDUSTRY STRUCTURE: AN OVERVIEW

46. Producing countries in the sub-Saharan region have neither the technological nor the financial means to undertake oil exploration and exploitation. They largely rely on Western companies, although national parastatals do participate in operating companies,[28] and a number of new non-traditional partners such as Petrobras, a Brazilian company, have appeared on the scene.

47. African governments have organized control of the oil sector institutionally through state enterprises or joint ventures of state and international oil companies (see box 8). These entities generally own the technical infrastructure (terminals, refineries, storage structures, etc.), and coordinate commercial policies. Moreover, in most cases, they have a monopoly on supply and distribution within the country.[29]

48. Schematically, the oil industry in crude oil producing countries can be subdivided into four levels, shown below with an indication of the main actors:

1		2		3		4
exploration extraction	------>	refining	------->	storage	------->	distribution marketing
transnational companies		national company or joint venture		joint venture		transnational companies + local enterprises

A. Exploration and extraction

49. Exploration and extraction of crude represents the upstream part of the oil industry. As in all regions of the world, this part is dominated by integrated international oil companies, which have the financial assets needed to assume the risks inherent at this stage.[30] In sub-Saharan Africa, these companies normally operate through production sharing agreements, which

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[28] Nigeria's national oil company, NNPC, has a 57 per cent share in all oil producing enterprises in the country, with only one exception (Ashland, in which Total has a 50 per cent share). In Angola, Sonangol has held a 51 per cent share in all producing ventures since 1987, although, with one exception, all oil wells are operated by foreign partners. In some countries, governments are reducing their share in oil companies; for example, in Congo the Government has recently sold its 25 per cent share in Elf Congo and its 20 per cent in Agip Congo Recherches, the two major production companies.

[29] Although legally the national oil companies do not seem to have a monopoly position, until recently they were de facto the only ones that could sell oil to domestic refineries.

[30] Investments in the oil industry can be large. In Nigeria, for example, Shell operates 1,000 wells, with production passing through 86 plants; the unit cost of such a plant is US$ 50 million. In 1996, investments required in Nigeria's oil industry were estimated at US$ 4 billion.

vary from one case to another, with an average duration of 20 years.

50. At this stage, African States guarantee to exploring enterprises a minimum profit[31] according to technical factors such as geological conditions of basins and investment costs. The country receives royalties[32] through the national company on the volume of crude produced, and a certain quantity of crude in kind. The national share of production can be sold on the international market, or the foreign company can pay for it in cash.[33] It can also be processed locally: the oil producing countries in the region except Equatorial Guinea and Benin have at least one refinery.

51. Upstream, the French oil company Elf is dominant, producing 448,000 barrels a day of crude oil and hydrocarbons extracted from natural gas, three-fifths of which come from Nigeria and Gabon.[34] The company is also active in the other French-speaking countries (in Congo, for example, it accounts for 80 per cent of production). Half of Elf's world-wide reserves are in the Gulf of Guinea. In second position, Shell - the Anglo-Dutch company - is particularly strong in Nigeria, with 47.8 per cent of the total production of foreign companies in the country.[35] The American company Chevron is very active in Nigeria, Zaire and especially Angola, where it controls two-thirds of crude oil production. All the "majors" are active in the region and a number of

BOX 8

THE COSTS OF CO-PRODUCTION IN NIGERIA

Nigeria's oil fields are in general small: from one year to another, production can decline by 15 per cent as a result of decreasing pressure and of water infiltration. A continuous drilling programme is thus necessary for maintaining production. However, the financial difficulties of Nigeria's oil parastatal-NNPC-have led since 1993 to a reduction in expenditure, and the lack of maintenance has caused some wells and oil pipelines to be closed down.

NNPC's financial difficulties are partly due to a government decision in 1992 to reduce its operating margin, in particular for local sales. NNPC has a 57 per cent share in almost all oil sector activities, and thus, has to share in 57 per cent of all production-related costs. Temporarily, foreign companies can defray all costs, but once too much debt has accrued, the result will be a reduction in spending. According to Elf, NNPC's debts to international oil companies have already reached the US$ 1 billion level (partly in nairas): US$ 380 million to Shell, US$ 200 million to Chevron and Mobil, and US$ 100 million to Agip and Elf.

Source: *Petroleum Economist*, February 1995.

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[31] For example, in 1991 NNPC signed a Memorandum of Understanding with its partners, providing incentives over a five-year period. Among other things, profit margins were guaranteed, from US$ 2.3/barrel if the technical exploitation costs of the well are less than US$ 2.5/barrel, to US$ 2.5/barrel for exploitation costs between US$ 2.5 and 3.5/barrel.

[32] In reality, it can be difficult to ensure a proper tax collection. But the threat of a tax audit is often a tool to make oil companies pay more taxes or invest more.

[33] This is the case in Zaire, for example.

[34] Gabon is the main producer; Elf's profit there has been between US$ 50 and 60 million in recent years.

[35] Shell has a 30 per cent share of the production of the Bonny and Forcados fields, which ensures for it a daily output of almost 300,000 barrels. This equals Shell's total production in the rest of the world.

independents are also represented.[36] Table 7 gives an overview.

Table 7

Main international oil companies active in sub-Saharan Africa

	Angola	Cameroon	Congo	Gabon	Equatorial Guinea	Nigeria	Others
Total		R, D		E, R, D	D	P, D	**Côte d'Ivoire**: R, D. **Senegal**: R, D. **South Africa**: R, D.
Shell	E, P	E, P, R, D	E	E, P, R, D		E, P, D	**Chad**: E, D. **Côte d'Ivoire**: P, R, D. **Kenya**: R, D. **Namibia**: E, P. **South Africa**: R, D. **Senegal**: R, D. **Zaire**: P, D.
BP	E						**South Africa**: R, D. **Senegal**: R. **Kenya**: R, D.
Elf	E, P	E, P, D	E, P, R, D	E, P, R, D		E, P, D	**Chad**: E. **Niger**: E, D. **Côte d'Ivoire**: R, D. **Senegal**: R, D.
Caltex							**South Africa**: R, D. **Kenya**: R, D.
Mobil		P, R, D		R	E	P, D	**Côte d'Ivoire**: R, D. **Senegal**: R, D.
Petrofina	E, P, R, D	E		R, D			**Zaire**: E, P, D.
Exxon	E						**Kenya**: R, D. **Niger**: E. **Chad**: E.
Chevron	E, P		E, P			E, P	**Zaire**: P. **Namibia**: E.
Texaco	E, P	R, D		R		E, P, D	**Côte d'Ivoire**: R, D.
Phillips Petroleum		E		E	E, P	P	**Côte d'Ivoire**: E.
Agip	E, P		E, P	R		P, D	**Tanzania**: R, D. **Zaire**: R, D. **Zambia**: R, D.
Others	Ranger Oil, Statoil, Conoco, Norsk Hydro - E. Petrogal - E, D.	Perenco - P.	Engen - E, P. Amoco - E.	Engen, Perenco, Occidental, Marathon, Amerada Hess, Arco, Amoco - E. British Gas - P.	Walter Int. - P. UMC - E.	Amoco - P.	**Benin**: Pluspetrol - P. **Eritrea**: Amoco - E; Anadarko - E. **Djibouti**: Chevron - E. **Sudan**: Arakis Energy - E. **Guinea-Bissau**: Monument Oil - E; Petrogal - D. **Côte d'Ivoire**: ADDAX - E; UMC/Pluspetrol - E, P. **Zaire**: Teikoku Oil - P; UNOCAL - P.

Sources: MBendi Information Services; various issues of *Marchés Tropicaux et Méditerranéens and BP Review*; Shell.
Notes: E: exploration; R: refining
P: production; D: distribution - only mentioned for countries with exploration, production or refining.

[36] In Equatorial Guinea, Walter International, an American independent, took over the interests of the Spanish company Repsol in 1990. The company exported 1.2 million barrels of crude oil in 1993, with a value of over US$ 23 million.

B. Refining

52. After African States achieved political independence in the 1960s and 1970s, many of them decided to build a refinery for economic reasons, to ensure energy independence, or often for reasons of status. However, it is difficult to make refineries economically viable. A refinery capacity of 20,000 barrels a day is considered a minimum. Eleven countries in sub-Saharan Africa, out of the 17 with a working refinery,[37] reach this level. The problem of refining capacity is discussed in box 9.

53. The composition of the refining industry in the region is illustrated in table 8. In one case out of four, the refinery is state-owned. In the others, refineries are generally joint

BOX 9

THE LINK BETWEEN REFINERY SIZE AND ECONOMIC VIABILITY

According to industry sources, the minimum size of a viable refinery is 20,000 b/d. In sub-Saharan Africa, particularly in countries not producing any crude, this level is often not reached. Only South Africa, Nigeria and, to some extent, Kenya, Côte d'Ivoire and Cameroon have refineries which can benefit from economies of scale. The other refineries have normally been constructed to serve local, relatively small markets. In addition to having a small capacity, their technical configuration is relatively simple, and generally not very efficient in producing light products such as petrol or kerosene from heavier crudes.

They often have financial difficulties:

- Their capacity is underutilized: owing to a lack of maintenance, they are generally used for less than half of capacity. Significant investments will be necessary to remedy this situation. Building new refineries will be even more expensive. In Angola, for example, over US$ 2 billion would be needed to construct a refinery, while in Benin a US-local joint venture plans to invest over US$ 900 million.

- The smaller the structure, the higher the fixed costs per barrel. According to a 1980 World Bank study, the fixed costs for a 20,000 b/d refinery were US$ 4.5 per barrel, compared with US$ 2.1 per barrel for refineries of 120,000 b/d (the common size for European and American refineries).

In this light, the plans to build a 2,000-5,000 b/d refinery in Chad would appear somewhat surprising. Even if the economics of refining in Chad are different than those in coastal countries (the transport costs of importing oil products are high), it would seem doubtful whether this investment is economically justifiable.

[37] In several countries, refineries have had to stop operating, because of financial, managerial and/or political problems. This was the case for the Zimbabwe refinery in 1965, the Sierra Leone and Togo refineries in 1982, the Mozambique refinery in 1984, and the Somalia refinery in 1991.

Table 8
Composition of refining industry in sub-Saharan Africa
(refineries active in January 1995)

Country	No. of refineries	Name	Place	Ownership	capacity b/d 1991	1995
South Africa	4	SAPREF	Durban	Shell 50%, BP 50%	120 000	165 000
		ENREF	Durban	Engen 100%	67 000	104 000
		CALREF	Cape Town	Caltex 100%	60 000	90 000
		NATREF	Sasolburg	Sasol 63%, Total 37%	78 000	86 000
Angola	1		Luanda	State 36%, Fina Petroleos de Angola 55%, others 9%		32 100
Cameroon	1	Sonara	Limbé	State 38.2%, SNI 27.5%, Total 8%, Mobil 8%, Shell/Pecten 8% Texaco 0.3%		42 000
Congo	1	CORAF	Pointe-Noire	Hydrocongo (parastatal) 60%, Elf 40%		21 000
Côte d'Ivoire	1	SIR	Abidjan	State 47.2%, Total 10.3%, Elf 15.1%, Shell 10.3%, Mobil 8%, Burkina 5.4%, Texaco 3.7%		64 400
Eritrea	1	ASEB	Assab	State 50%, Ethiopian Petroleum Corp. 50%		18 000
Gabon	1	SOGARA	Port-Gentil	State 25%, Elf 24%, Total 19%, Mobil, Shell, Texaco, Agip, Fina 6.25% each, others 7%		17 300
Ghana	1	Tema Oil Ref.	Tema	State (Ghana National Petroleum Corp.) 100%		25 315
Kenya	1	KPRL	Mombassa	State 50%, Caltex 11.75%, BP 12.7%, Shell 12.7%, Esso 12.85%		90 000
Madagascar	1	Solima	Tamatave	State 100%		16 350
Mauritania	1	SOMIR	Nbou	State 100%		20 000
Nigeria	4	Kaduna Ref. & Petrochemical Co.	Kaduna	State (NNPC) 100%		104 500
		Port Harcourt I	Alesa-Eleme	State (NNPC) 100%		60 000
		Port Harcourt II	Alesa-Eleme	State (NNPC) 100%		150 000
		Warri Refinery & Petrochemical Co.	Warri	State (NNPC) 100%		118 750
Senegal	1	SAR	Mbao	Elf 30%, Shell 23.6%, Total 12.8%, Mobil 11.8%, BP 11.8%, Banque Nationale du Sénégal		17 000
Sudan	1	Port Sudan Refinery Ltd.	Port Sudan	State 100%		21 700
Tanzania	1	TIPER	Kigamboni	State 50%, Agip 50%		15 750
Zaire	1	SOZIR	Muanda	State 50%, Agip 50%		17 000
Zambia	1	IPR	Ndola	State 50%, Agip 50%		23 750

Sources: *Oil & Gas Journal*, December 1994; *Petroleum Economist*, April 1995; *Marchés Tropicaux et Méditerranéens*, October 1995.

Abbreviations:

CORAF	Congolaise de Raffinage
IPR	Indeni Petroleum Refinery CL
KPRL	Kenya Petroleum Refineries Ltd.
NATREF	National Petroleum Refiners of South Africa PL
SAPREF	South African Petroleum Refineries PL
SAR	Société Africaine de Raffinage
SIR	Société Ivoirienne de Raffinage; includes the Sté Multinationale de Bitumes
SOGARA	Société Gabonaise de Raffinage
SOMIR	Société Mauritanienne des Industries du Raffinage
SOZIR	Société Zairo-Italienne de Raffinage
TIPER	Tanzanian & Italian Petroleum Refining CL
ENREF	Engen Refinery
CALREF	Caltex Refinery
ASEB	Assab Refinery
NNPC	Nigerian National Petroleum Corp.

ventures[38] with the same international companies active in other areas of the oil sector. In oil producing countries, the local refinery is theoretically supplied by national production. However, some producers have to use lighter types than those produced locally, because the technical structure of their refinery cannot optimally process the local crude.[39] Locally produced crudes are then "exchanged" for foreign crudes, often not in an efficient manner.

54. Transnational oil corporations are strongly represented in the refineries of sub-Saharan Africa. When part of a joint venture, they are generally in charge of the management of the refinery. This is the case of Agip in the three refineries where it has a 50 per cent interest (in Tanzania, Zaire and Zambia); Shell in Kenya; and Elf in Congo and Gabon. The French company Total is technical adviser to Sonara in Cameroon.

55. One-tenth of African crude production is refined and consumed in the region. Although demand for oil products in the region tends to be for light rather than heavy products (light products such as petrol are used for transport), the refineries in the region have been configured to have a relatively large output of heavy products. Re-configuring such refineries is very costly.

56. Only the refineries of South Africa, Nigeria, Kenya and, to a lesser extent, Côte d'Ivoire are producing substantial quantities of white products. Unfortunately, the Nigerian and Kenyan refineries are not very efficient, and both countries are importing more and more oil products.

57. Oil trade is one of the rare examples of South-South trade within Africa, as two-thirds of the refineries in sub-Saharan Africa use crude produced in the region (see table 9). Moreover, the Government of Burkina Faso has a 5.4 per cent share in the Côte d'Ivoire refinery, and Unipetrol,[40] 40 per cent owned by Nigeria's NNPC, the Freetown Oil Refinery bought in 1996 from the Sierra Leone Government for US$ 1.2 million (the costs of rehabilitation are evaluated at between US$ 1.5 and 2 million).

58. As most refineries in the region are not competitive, it is not clear how many will survive exposure to the world market and foreign competition. Only those in South Africa (see box 10), Nigeria, Kenya, Côte d'Ivoire[41] and possibly Gabon seem to be able to face the competition from the US Gulf Coast refineries, and refineries in the Caribbean and Europe.

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[38] With the exception of the Mauritanian refinery, which is owned by the Government, but managed by an Algerian parastatal.

[39] This is the case in Zaire, Côte d'Ivoire and Cameroon, where the refineries use imported crude oils, as locally produced crudes are not suited for their technical configuration. In the first two cases, this is because the refineries were constructed over ten years before crude oil production started. The case of Cameroon is somewhat more surprising, as the refinery opened in 1981, while crude oil production started in 1977.

[40] Its Unipetrol-Togo subsidiary is also very active in the distribution of crude oil and oil products in Togo, including in exports to Mali and Burkina Faso.

[41] In 1993, the Société Ivoirienne de Raffinage (SIR) in Abidjan had an estimated profit of 3.7 billion CFA francs. In 1994, the refinery's operations were severely affected by a prolonged strike.

Table 9

Types of crude oil used in African refineries

Country	Main type of crude
South Africa	Iranian light (Iran)
Angola	Palanca, Kwanza (local)
Cameroon	Kole (local), Brass river (Nigeria)
Congo	Djeno (local), Cabinda (Angola)
Côte d'Ivoire	Forcados (Nigeria)
Eritrea	Soviet Blent (ex-URSS)
Gabon	Mandji, Rabi (local)
Ghana	Bonny light, Brass river (Nigeria)
Kenya	Murban-based feedstock (United Arab Emirates)
Madagascar	Arabian/Iranian light (Saudi Arabia, Iran)
Mauritania	Zarzantine Algeria (Algeria)
Nigeria	Escravos, Bonny light/medium (Nigeria) Arabian light (Saudi Arabia)
Senegal	Bonny light (Nigeria), Mandji (Gabon)
Somalia	Arabian light (Saudi Arabia)
Sudan	Iranian light (Iran)
Tanzania	Arabian (Saudi Arabia)/Iranian light-based feedstock (Iran)
Zaire	Bonny light, Escravos, Pennington (Nigeria)
Zambia	Arabian light (Saudi Arabia)

Sources: Petroleum Industry Data Sheets, Note No. 17, World Bank, September 1992; Horsnell and Mabro op. cit.
Note : Origin of crude is indicated in parentheses.

59. Multilateral institutions such as the IMF and the World Bank, which are very important in the region, strongly recommend the liberalization and, in some cases, the complete closure of refining structures. Their principal argument for a reduction of the role of the State in the downstream business is that it will make it easier to attract risk capital for crude oil exploration and production; that service to consumers will increase; and that it would reduce the need for government subsidies. As for distribution, much pressure is put on countries to revise their renumeration systems.

60. However, several countries are reticent about change, for example Tanzania. According to the Tanzanian Government, a liberalization of the oil sector could be dangerous because it engenders dependence on international oil firms. Oil imports into Tanzania used to be free until the mid-1970s. But when the American companies which accounted for a major share of those imports were boycotted by leading Middle East exporters in 1973, the country experienced a major oil shortage, despite the fact that tankers full of oil were floating nearby in the Indian Ocean. This experience is compounded by a fear of transfer pricing by distribution companies.

61. According to some studies, the demand for oil products in Central, East and Southern Africa is increasing fast, at about twice the rate of GDP growth. If this trend were to continue, demand for gasoline could not be met by current regional supplies from 1997 onwards; and the same would happen with diesel from 1998-1999 onwards. This shortage would grow if, as the World Bank requires, some refineries in the region were to close. This therefore provides good possibilities for new refineries.[42] Taking into consideration environmental problems, it is quite probable that those new refineries would not be located in South Africa, but perhaps in Mozambique or Angola if their governments reacted favourably.[43]

62. In many countries, the IMF and the World Bank have set as a precondition for disbursement of credits, the liberalization of the oil sector and, in a number of cases, also the closure of refineries.[44] Deregulation is thus likely.[45] Mali, Uganda and, since November 1994, Kenya have already liberalized their domestic oil market, abandoning the old system of government-set prices. In Kenya, for instance, foreign oil companies, including Shell and Exxon, which together own 50 per cent of the Kenyan Petroleum Refinery Limited (KPRL), no longer have to go through the State to import their crude.

BOX 10

SOUTH AFRICA'S PETROLEUM INDUSTRY

South Africa's heavily regulated oil industry employs some 11,000 persons, and accounts for 7 per cent of GDP. Because of the country's isolation during the apartheid years, the industry now includes a large coal- and natural gas-based synthetic fuels sector. The country also has sub-Saharan Africa's largest refining capacity, which increased from 325,000 b/d in 1991 to 445,000 b/d in 1996.

With the opening up of South Africa's economy, an important potential for the export of petroleum products to other countries in the region was created; and this potential will be even greater if, as planned, many of the smaller refineries are closed. In response to this changing international environment, the debate has started in South Africa on the restructuring of its oil sector policies. The National Economic Forum's Liquid Fuels Task Force has made proposals on:

- the reform of the system for fixing the prices of oil products;
- distribution policies;
- government subsidies to the synthetic fuel industry.

Nevertheless, reforms are proving difficult, and as of mid-1996 few major changes in existing policies had been made.

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[42] Nigeria's Government approved in 1996 the construction of two new private sector refineries.

[43] See the document prepared by Brian Paxton, Director, Mbendi Information Services for the African Oil Trade Conference, Harare, April 1996.

[44] This is the case, for example, in Congo and Tanzania. In the latter country, the closure of the TIPER refinery, a joint venture between the Government and Italy's AGIP, is one of the preconditions for approval of the second (US$ 200 million) tranche of the World Bank's 1996 Structural Adjustment Programme for Tanzania.

[45] Retail petroleum product prices have sharply increased since the devaluation of the CFA francs in January 1994.

C. Storage

63. Storage of crude in producing countries is generally in reservoirs which are built in the sea, thus allowing tankers to charge crude oil (with the added advantage that the oil is relatively safe in the case of armed conflict). Nigeria, Angola, Cameroon, Congo, Côte d'Ivoire, and Gabon all have such offshore reservoirs, and one was planned in Equatorial Guinea for 1996. Only Zaire, where all oil is produced on land, has no such reservoir.

64. In importing countries, oil products and crude arrive by tanker. If the country is landlocked, as is the case for more than one-third of countries in sub-Saharan Africa, imports are costly and difficult, exposing the country to the risk of political problems in its neighbour. For example, since about four-fifths of Zimbabwe's oil imports normally transit through Mozambique, Zimbabwe has paid a heavy price for the past conflicts in Mozambique.[46] This landlocked situation is worsened by poor road infrastructure, which adds costs to imported products and reduces the net revenue of exports.[47]

65. Within countries, storage of oil products is in general managed by joint-venture companies; these are often companies involving the State and a foreign enterprise.[48] Storage of oil products is generally in small oil tanks. In many countries, these storage structures are old and badly maintained.[49]

D. Distribution/marketing

66. Distribution and marketing of oil products in most countries in the region are controlled by the same transnational corporations which are present throughout the whole oil exploration, production and processing chain (see table 10). Three such companies are active throughout most of the continent, namely Shell, Total and Mobil. Shell, present in oil distribution in 29 sub-Saharan African countries, controls more than a third of the market in South Africa, Mauritius and the Horn of Africa. Total, which accounts for about one-sixth of oil distribution in sub-Saharan Africa, is active in 28 countries; and sales in South Africa account for about one-third of its total sales. Mobil is active in 24 countries. The other major oil companies, such as Elf, BP, Caltex and Petrofina, concentrate their distribution activities in certain parts of Africa. For

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[46] Oil destined for Zimbabwe passes through a pipeline from the port of Beira to Harare and Mutare. Tanzania is an important transit point for oil to Zambia, which passes through a pipeline jointly owned by the Zambian and Tanzanian governments. The exploitation of Chad's oil requires the construction of a 1,050 kilometre-long pipeline to the newly constructed port of Kribi in Cameroon.

[47] In the rainy season, it can easily take a truck three to four hours to cover 100 kilometres on a non-asphalted road. In more general terms, road transport charges are very high in Africa; for example, the cost per kilometre is twice as high in Côte d'Ivoire as in Pakistan.

[48] These companies are normally already active in exploration, production and refining in the region.

[49] Quite a few projects to improve storage capacity are under way in the region; for example, in Zimbabwe, US$ 300 million will be spent to construct underground storage facilities of sufficient size to hold six months consumption. To the extent that storage is seen as a way to protect against price increases, this is a very doubtful strategy: holding futures contracts or options would probably be cheaper.

example, Elf is mainly active in French-speaking countries in West Africa, while BP, after selling most of its interests in that region to Elf, concentrates on Southern Africa.

Table 10

Transnational companies in the distribution sector in sub-Saharan Africa
(number of countries)

	West Africa	Central Africa	Southern Africa	East Africa
Agip	2	2	1	6
BP	-	-	10	4
Caltex	-	-	10	2
Elf	9	3	-	1
Engen	-	-	5	1
Mobil	9	4	6	5
Petrofina	-	4	-	2
Shell	10	4	7	8
Texaco	5	2	-	-
Total	8	5	7	8

Source: Based on MBendi Information Services data.

67. Although the State has a monopoly on oil imports in many countries in the region, marketing and distribution are normally privately controlled. In only six countries (Benin,[50] Comoros, Congo, Sao Tome and Principe, Somalia and Seychelles) is the State the monopoly distributor. In four other countries (Mauritania, Equatorial Guinea, Mozambique and Zambia), the State has a share of at least 50 per cent in joint ventures distributing oil products. In a number of other countries, government-owned companies are active in distribution, but have only a minority market share - for example, African Oil in Nigeria, Goil in Ghana (a 25 per cent market share), PetroZaire in Zaire (19 per cent) and PetroIvoire in Côte d'Ivoire (8 per cent).

68. A number of privately owned African groups are active in the distribution sector. The largest is Engen, a South African company, which has important market shares in most Southern African countries; for example, it controls almost a third of distribution in Botswana. In East Africa, local companies such as Kobil or Gapco have in recent years acquired the distribution

[50] In July 1996, Benin adopted a law to open up oil distribution to the private sector.

structures (oil terminals, transport pipelines and service stations) of transnational corporations. In Chad, local private enterprises control one third of the local market for oil products. In Burkina Faso (discussed further in box 11), a local company - Tagui - has a 5 per cent market share. In other countries, local private groups have entered into joint ventures with transnationals; for example, in Malawi an entity which is four-fifths controlled by local private interests and one-fifth by BP has a market share of more than 60 per cent.

69. The transportation of oil products within countries is often by truck, despite the generally poor state of the road network. Railways are hardly used, and a domestic pipeline network is lading in most countries, as are subregional networks.

70. According to the World Bank, which bases itself on its experience in other regions, the dismantling of existing monopolies in the oil sector in sub-Saharan Africa would allow important savings. Although this may be true, it is likely in many countries, that foreign oil companies will resist any move towards market liberalization. In Cameroon, for example, the international companies already active in distribution are hostile to liberalization of the marketing sector because they fear they will be the only ones forced to follow the official rules (taxation, safety and quality norms) in a market that is already destabilized by oil products illegally imported from Nigeria.[51]

BOX 11

THE CASE OF BURKINA FASO

Burkina Faso is a landlocked country in West Africa. As it neither produces crude oil nor has a refinery, all oil products need to be imported, absorbing about 45 per cent of its export revenue. They need to be transported by train or by road, principally from the ports of Abidjan in Côte d'Ivoire and Cotonou in Benin. The country has two oil terminals, of 36,000 cubic metres each, and a of 500 oil trucks (each with a capacity of 30,000-60,000 litres). This storage capacity is barely enough for two months' consumption.

Because storage capacity is so limited, transport problems or sudden price hikes can have a major impact. For example, if the port of Abidjan were congested, this would cause, over a period of three months, extra transport costs of 400 million CFA francs (4 million French francs). If the port of Cotonou were congested, the country would have to replace the fuel oil it normally uses for electricity generation by gas oil, which would cost, each month, an additional 300 million CFA francs. For this reason, the country hopes to double its storage capacity, so as to have sufficient capacity to store the equivalent of 90 days, consumption. The cost of this investment is estimated at about 3.7 billion CFA francs.

Petrol distribution and marketing are in the hands of five private companies (four foreign companies and Tagui, a company owned by local private interests). Another local company, the Société de Transport et de Distribution (STD), has the de facto monopoly on the distribution of liquefied petroleum gas.

Source: *Energie et Développement Socio-Economique au Burkina: Projet de Développement du secteur de l'électricité*, 2-5 July 1996; Documents préparatoires, Ministère de l'Energie et des Mines.

[51] *Marchés Tropicaux et Méditerannéens*, 8 December 1995.

Chapter IV

OIL PRICING MECHANISMS AND MARKETING PRACTICES

A. International oil pricing mechanisms

71. Oil prices result from a combination of economic, political and institutional factors. The strategic importance of oil greatly complicates its price formation process. Markets are far from perfect, and to understand how prices are formed, some knowledge is needed not only of production structures and costs, but also of the policies as implemented in different periods (see box 12).

BOX 12

MARKET STRUCTURES AND PRICE FORMATION

The evolution of oil price formation systems runs parallel to the evolution of the oil industry itself.

Until 1973, prices were set by the "majors" (the seven largest oil companies together with the Compagnie Française des Pétroles, later renamed Total), which controlled the oil sector in all respects. Thanks to their control over Middle East reserves, and their large refining and marketing networks, these companies were integrated "from well to pump". Virtually all transactions were on the basis of long-term, fixed-price contracts.

Between 1973 and 1986, prices remained set, but this time by the producing countries. The main producers had organized themselves into OPEC during the 1960s and early 1970s, soon nationalizing oil production and using their control over supply to influence prices. As demand, in the short run, was inelastic, their market control allowed them to raise prices to levels much above those of the 1960s: from 1973 to 1981 crude oil prices went up from US$ 2 to 30/barrel. A growing part of oil trade was effected through spot transactions, generally at prices based on OPEC's official prices.

From 1987 onwards, the emergence of new, non-OPEC producers helped to break the OPEC cartel. Supply increased, and the oil majors were no longer dependent on OPEC pricing rules. OPEC countries were forced to abandon their system of price setting, first by giving variable discounts, and then by dropping their official prices altogether and replacing them with reference prices. Crude oil trade on futures markets became important, taking over from OPEC and the spot markets as the main centre for price formation.

In the future, the majors may succeed in gaining control again over production. Most have intensified their involvement in frontier areas such as Russia and Central Asia, so as to secure control over supply once more and thus minimize the risk of future supply ruptures.

72. From the point of view of economic theory, when supply is as abundant as it has been

over the past ten years, one would have expected marginal fields, including those in the North Sea, to become non-operational in view of their very high production costs (10 to 15 dollars per barrel against 8 to 10 dollars in the Americas and 0.5 to 1 dollar in the Middle East). However, no fields have been closed for economic reasons; rather, the number of operational fields has increased.

A.1 Crude price determination

73. In the oil products market, there are many buyers, all interested in low prices. In the crude market, vendors are few, and are looking for high prices. The refiners, who are in between, are not interested in the level of the prices, but in the margins they can obtain. This makes for a rather complex system of price determination. The value of each type of crude derives from the value of products which can be produced with this crude. The intense competition between refineries, each of which has its own technical specifications and thus its own way of calculating the value of the crude oil its uses as its input, transforms product prices into crude prices. In other words, the relation between prices of different types of crude oil depends on the technical characteristics of the crude oils and the individual technical configuration of refineries as well as on geographical and seasonal factors. Moreover, although in the short term, the price of each oil product depends on demand, in the long term, technological innovations and the level of investment all have an impact on price relations.

74. Most international oil prices are expressed in United States dollars, and determined with reference to the price of one or more of the three major types of crude traded (West Texes Intermediate, Brent and Dubai). In sub-Saharan Africa, the prices of local crudes are calculated on the basis of the Brent price corrected by a differential: either a premium or a discount, which is determined by the crude's quality and the distance of its production site from the main refining centres. This premium or discount normally fluctuates seasonally, with relatively higher prices for light crudes in summer (when petrol demand is high). In practice, even though some African crudes are of better quality than the reference crudes, the distance between their countries of production and the refining centres in the Mediterranean and on the United States Gulf Coast results in their being traded at a discount. The only exception is Nigerian Bonny light, which traded at a premium of some 10 cents/barrel in early 1996 (it would have been 80 cents/barrel if it had not been for the great distance between Nigeria and its main refining centre in the United States).

A.2 Type of market and contractual forms

75. Prices are formed through an interplay of two markets, apparently distinct but in fact interdependent:

- the physical market, in which the final goal is to deliver;

- the paper market (or financial market), in which participants exchange price risks - delivery is rare. The paper market consists of over-the-counter, or unorganized trade; and of trade on organized exchanges (the New York Mercantile Exchange, the International

Petroleum Exchange in London, and the Singapore Mercantile Exchange). In the over-the-counter market, any transaction to which two parties agree is possible, so transactions are difficult to categorize. Nevertheless, the most common transactions here are "daisy chain" transactions on the Brent forward market (and, to a lesser extent, forward markets for some other crudes - this is further discussed below), where the purpose is to manage price risks, but the last one to buy a contract has to take delivery; straighforward swaps, which are financial contracts with, in fact, guarantee a more or less fixed price to one of the parties; and over-the-counter options ("caps" and "floors" are the most common types), which are similar to price insurance. On the organized exchanges, fungible instruments are traded, meeting uniform specifications. This standardization is a *sine qua non* for an efficient market, because it allows an efficient matching of supply and demand, ensures a ready market at any moment, and simplifies transactions.

Table 11 sets out these two types of markets schematically.

Table 11

Organization of oil markets

	Physical markets	Financial markets
Unorganized market	Spot and forward ("term") contracts	Over-the-counter contracts: daisy chain forward contracts, swaps, caps, floors, and hybrid risk management contracts
Organized market	Public tenders for oil (for other commmodities, auctions exist)	Futures and options exchanges

2.1 The free market

2.1(a) The spot market

76. In the early 1970s, the nationalization of oil industries in the principal oil producing countries led to a disequilibrum in crude oil supply. The major oil companies had to redefine their stock management policy completely, changing from a situation in which their crude supply exceeded their refinery capacity to one in which they needed to buy crude oil on the spot market. As a result, the spot market, until then fairly marginal, rapidly grew in size.[52] It developed

[52] Until the emergence of OPEC, the spot market represented only some 2 to 5 per cent of international oil products trade; crude spot trade was almost non-existent. In 1984-1985, spot markets for crude oil had grown to one-third of world oil trade, a level that has since declined, largely as a result of the growing importance of the oil futures markets for price reference purposes.

from a market where accidental surpluses were sold to the main market for the purpose of balancing supply and demand. The largest and best-known spot market is the Rotterdam market, with "Rotterdam" in effect standing for the Antwerp-Rotterdam-Amsterdam (ARA) port region, where many international oil brokers are concentrated.[53]

77. Deals on the spot market normally envisage delivery within one or two weeks from signing of the contract; thus, some 90 per cent of deals concluded in the spot market result in physical delivery. However, there are also contracts that are closed out before delivery is to take place, mainly to give buyers and sellers some flexibility for responding to sudden supply or demand problems, or to commercial opportunities. For example, a broker may sell a cargo of crude loaded at Pointe-Noire in Congo and to be delivered to the port of Marseilles in France. Then, Algerian crude oil becomes available, with sufficiently similar product specifications, but with some additional advantages in terms of taxes. The broker may then agree with the buyer to replace the Congo crude by Algerian crude, and with the Congo provider to do a "wash out" - that is, obtain an agreement on liquidation (paying or receiving compensation on the basis of price developments since the signing of the contract).[54]

78. Spot prices are published for many specific crude oils, representing the average of representative transactions by operators (traders and brokers) all over the world. The information is gathered and distributed by specialized information services.[55] The importance of these price quotations for oil price formation is undeniable: although the spot market only accounts for less than a third of world trade, another third is traded forward, but at prices determined (partly) by these spot prices.

79. An active spot trade exists for sub-Saharan African crude, notably for delivery along the US Gulf Coast. This trade is particularly dynamic for crudes produced on Africa's Atlantic coast, which are normally known as West African crudes, even though a major oil exporter such as Angola is located in the southern part of Africa. The growth of these spot markets was slower than for other origins. From 1986 to 1991, the total number of spot transactions in West African crudes increased fourfold, from four cargoes a week to 15 a week, although this number remains small compared with spot trade in North Sea oil, where on average 30 cargoes a day are

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[53] While a trader takes commercial risk and undertakes to deliver or take delivery at a certain price, a broker works for a commission. The broker's main duty is to bring a buyer and a seller into contact. Brokers as they exist in Africa are not really the same as the specialized oil brokers in Europe, but nevertheless, they receive commissions for arranging deals. Commissions for these intermediaries are estimated to cost some US$ 200 millions a year in Nigeria alone.

[54] It is important to note that a fixed-price contract itself has a value; unless prices since the signing of the contract have remained the same, cancellation of the contract means either that the buyer can or must sell his crude on the world market for a higher or lower price than that originally contracted, or that the seller can or must procure crude for a higher or lower price. If the seller defaults for one reason or another, but world market prices have declined since the contract was signed, he is thus entitled to a compensatory payment, equal to a large part of the savings that the buyer makes by obtaining his oil from a cheaper source. This is true also if a contract is renegotiated, or even for price formula contracts for which the adjustment factor has changed drastically.

[55] Platt's Oilgram Price, (Mc Graw-Hill, New York) is the main information service in the world and also the one principally used in Africa's oil trade.

sold. Most of the spot sales come from the equity shares of Western producers in the region. In Nigeria, for instance, the transnationals which are partners of NNPC are allowed to market roughly 800,000 barrels of crude per day. While in the mid-1980s, most spot sales of West African crudes were on an outright (fixed-price) basis, since 1991 most trade has been on the basis of reference prices, as is the case on the North Sea oil spot market.

2.1(b) Over-the-counter market or negotiated market

80. A considerable part of oil trade is not spot, but forward, using bilaterally negotiated forward delivery contracts. While, in principle, these contracts are meant to result in physical delivery, in practice they are often used for price risk transfer: so-called daisy chains can be formed, with buyers or sellers closing out their positions by undertaking compensating transactions.[56] These chains of forward contracts are used for the main types of crude, including (albeit with short chains) for several African crudes. Bilaterally negotiated contracts of another type, namely swaps, over-the-counter options and hybrid risk management contracts are from the outset not meant for making physical delivery, but for the transfer of price risks.

b.1 The forward market

81. Most African crudes are sold forward, under so-called term contracts. In the forward market, parties directly negotiate the terms of their contracts. Unless the buyer or seller insists on non-transferability of the contract (which can be the case - for example, a producer such as Saudi Arabia does not want its contracts to be transferred), the contract can be traded with other parties. Forward contracts can specify a fixed price or a price formula (the latter now being the more common). The transaction costs of entering into forward contracts are generally low, as there are not many intermediaries. On the other hand, the price formation process is not very transparent, and parties are exposed to counterparty risks.

82. Price formulas normally contain four basis factors: the point of sale; the benchmark price; the adjustment factor; and the timing of the price-setting. For example, on 12 March 1994, NNPC had a cargo of Bonny light 37° API to sell in the United States. The price applied in the term contract was FOB (point of sale), the benchmark price was the average of Platt's quotations on Brent five days after loading, and the adjustment factor was 45 cents/barrel.

b.2 The financial over-the-counter market: Swaps and other financial instruments

83. The financial over-the-counter market relates to contracts for risk transfer which are traded outside organized exchanges. As these contracts are tailor-made for the needs of users, many different types exist, but the main ones are swaps and over-the-counter options.

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[56] Contrary to futures contracts, however, those who close out their positions remain exposed to counterparty risks. Suppose that on the forward market, A sells a contract to B. Then, A buys an identical contract from C, while B sells its contract to D. One could then assume that A and B no longer have a position, and that the delivery obligation is now from C to D. This is not correct, however. If C defaults, A still has to deliver to B, and B to D. Counterparty risks of this type often give rise to the development of futures markets, where a clearing house ensures contract performance, and where, once one has closed out one's contract, all obligations cease to exist.

84. Used for commodities only since 1986 (the first commodity swap was a jet fuel swap between a bank and an airline), swaps are contracts in which two financial flows are exchanged, generally a flow based on a fixed price against a flow based on a floating (market) price. The fixed price is determined through negotiation, normally on the basis of a modelled forward price curve, while the floating price is usually based on an index of a published price (either a futures market price or a price published by one of the information services). There is no delivery of physical commodities, only an exchange of financial flows (an example is given below). While swaps allow long-term hedge strategies, their use by developing country companies and governments is hindered by counterparty risk: both parties to a swap run the risk of default by their counterparty, a risk which in financial terms can be quite large in the oil market, given the typical size of transactions and trade.

85. The swaps offered on the over-the-counter market can be grouped into four categories. *Straightforward* (or *"plain-vanilla"*) *swaps* are an exchange of a single fixed price and a single floating price without the possibility for any of the parties involved to take advantage of positive market swings. *Collar swaps* (also called *min-max*) lock in a minimum price and a maximum price, rather than a single price. *Participation swaps* are similar to straightforward swaps, but with the difference that under these swaps the buyer or seller can benefit from a certain share of possible windfalls, should prices move favourably. Finally, *specialized swaps* embrace many different sophisticated types of swaps, usually either based on relations between two or more prices or containing different option elements.

86. Swaps are normally used for either of the following purposes: to obtain price risk management (or price exposure) for standard products such as crude oil for periods beyond 2-3 years (for shorter periods, the futures markets provide sufficient liquidity); or to provide short-term price protection for oil products (or relations between the prices of certain oil products) for which no futures markets exist. For longer-term deals for standard products, the swap market often offers better prices and lower price risks than alternative risk management strategies (for example, the rolling forward of futures positions). Futures markets do not exist for all products, and while indirect hedges are often possible (for example, jet fuel price risk can be covered by gas oil futures contracts), these are far from perfect, giving rise to the risk that price relations may change. Thus, the swap market, which could in the above example be used to take either a jet fuel swap or a swap which locks in the differential between jet fuel and gas oil prices, is safer. The main reason for using swaps rather than futures is this better matching of risk management needs and risk cover. However, an additional benefit for users is that margining arrangements are also bilaterally negotiated; that is, unlike on futures markets, users do not need to be exposed to the risk of having to transfer high margin payments.

87. An example of a straightforward swap is illustrated below.[57]

An oil producer sells his production on the market in quantities of X barrels per day. His revenue is the market price for the product at the time of sale.

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[57] See UNCTAD, *Price Risk Management in the Oil Sector: A manual* (UNCTAD/COM/Misc.100, October 1996).

quantity of X bbl/day of crude oil A
---------->
Oil producer Market
<----------
floating market price for X bbl of crude oil A

The producer has plans to expand drilling capacity, and wants to fix his revenues to be sure he can repay the loan needed for the investment. He finds a bank willing to guarantee the fixed price, and thus, to assure the price risk involved.

fixed price for X bbl/day of crude oil A
<----------
Producer Bank
---------->
floating market price for X bbl/day of crude oil A

The oil producer receives a floating market price for his crude oil sales, which he pays to the bank in exchange for the fixed price laid down in the swap agreement. The oil producer is no longer exposed to the price risk of his daily X barrels of crude oil (A) sales. The bank, on the other hand, has to pay a fixed price, while receiving the floating market price, thus being exposed to the price risks involved.

Consider the opposite case: an oil consumer, for instance a refinery, who wishes to have fixed price obligations for its input purchases. Normally, it buys the quantity of Y barrels of crude oil on the market against the prevailing spot price.

quantity of Y bbl/day of crude oil B
---------->
Refinery Market
<----------
floating market price for Y bbl of crude oil B

The refiner approaches a bank to agree on a consumer swap arrangement:

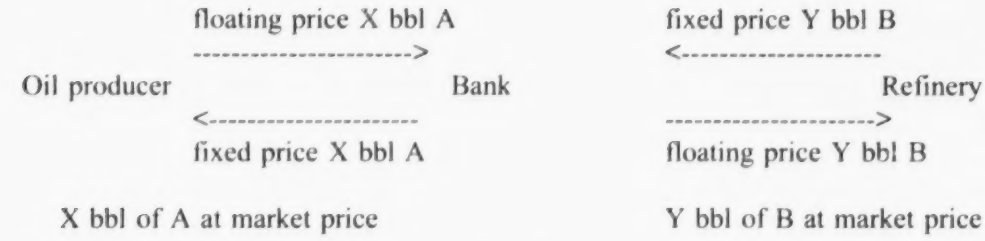
fixed price for Y bbl/day of crude oil B
<----------
Refinery Bank
---------->
floating market price for Y bbl/day of crude oil B

The refinery pays net a fixed price for its crude oil (B) purchases. The price risks are assumed by the bank, which guarantees the market price in exchange for a floating price.

A bank does not normally want to be exposed to these kinds of price risks for the often long

period of the swap. Consequently, the bank offsets the risks by opposite swaps with third parties, or (temporarily) on the futures and options market, when suitable contracts are available.

In the earlier examples, the bank can offset the price risks of the producer swap by arranging a swap with a party that wants to buy the products against a fixed price, in this case the refinery. Conversely, it can offset the price risks of a consumer swap by coupling it with a swap with a producer.


floating price X bbl A
fixed price Y bbl B
Oil producer
Bank
Refinery
fixed price X bbl A
floating price Y bbl B
X bbl of A at market price
Y bbl of B at market price

It follows from the above that there are four factors wich determine whether the swap, constructed in this way, is possible: A, B, X and Y. If the physical products (A) and (B) - crude oil - are not similar, it is very likely that prices have other characteristics. In that case, exchanging the cash flows resulting from the sales and purchases of products (A) and (B) may be too risky for the bank. Furthermore, if the quantities are not the same, the bank still has a price risk exposure; this problem can be solved by finding yet another consumer/producer. Often, the bank has to warehouse part of the price risks until another participant is found.

88. Various ways in which a sub-Saharan African country could make use of modern financial instruments are discussed by Tsatsu Tsikata, Chief Executive of the Ghana National Petroleum Corporation (GNPC), in a paper prepared for a 1996 UNCTAD/Eastern and Southern African Trade and Development Bank (PTA Bank) oil conference.[58]

89. One possibility currently under study concerns Valco (Volta Aluminium Company), a foreign-owned aluminium smelter. Valco consumes as much as 70 per cent of the electricity produced by the Volta Dam. GNPC is now looking at the possibilities of delivering electricity through the "Tano Gas Fueled Power Project". It could enter into a long-term power purchase agreement with Valco, linking electricity prices to the price of aluminium in the world market. By selling power to a metal producer whose price outcomes affect the government's earnings, the country achieves substantially the same economic result as it would achieve if it were selling metal. GNPC could "fix" the price it receives by entering into an aluminium swap, or could even enter into a "barter" swap fixing the price relation between its crude oil imports and these "virtual" aluminium sales, ensuring that the payments it received from Valco would always be enough to buy the crude oil necessary to produce an amount of electricity equivalent to what Valco uses.

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[58] T. Tsikata, "Adding value using risk management instruments: Import, project finance and client oriented applications", African Oil Trading Conference, Harare, UNCTAD/PTA Bank, April 1996.

90. A second example relates to the structuring of a US$ 75 million facility with which Ghana returned to the international capital market in 1991. This financing structure used the fact that the country needed pre-import finance for its oil and pre-export finance for its cocoa beans. The GNPC was provided with the oil import finance. After refining, the products were sold on the domestic market and the revenues credited to the Cocoa Marketing Board (Cocobod), which used them to pre-finance its cocoa purchases. The loan was then reimbursed from the proceeds of cocoa exports, which were credited to an escrow account partially controlled by the loan-providing bank syndicate. Both GNPC and Cocobod received funding at a cost much lower than would otherwise have been available, with the GNPC's interest rates even further reduced because, giving up the possibility to benefit from price decreases, it sold options on part of its imports. There was a significat exchange risk left (Cocobod's cocoa exports were denominated in British pounds, GNPC's oil imports in US$, but this was not covered until 1993). Although, now, GNPC' and Cocobod's financing are arranged separately, a financing structure such as this could have been used to support several different risk management programmes, e.g. for fixing the amount (or maximum amount) of cocoa beans that had to be exported to import one tonne of oil.

2.2 The futures market

91. Progress in technology and telecommunications has fostered the growing integration of world market trade. Actors around the world are now linked through commercial transactions, and this gives rise to types of risk that did not exist when trade was still localized and on a spot basis. The resulting price and counterparty risks have driven the development of organized commodity exchanges, where standardized contracts are traded to enable easy management of price risks, with a clearing house to eliminate counterparty risk. For historical reasons, these markets are generally located in well-established trading centres, which have a good supporting framework, including in terms of service industries, and good communications systems.

92. On these organized exchanges, futures and option contracts are traded. Although these contracts can be used for making or taking physical delivery, the main purpose in using them is to transfer price risks. Hedgers try to reduce their price risk, while speculators take on price risk. Futures markets are the barometer of trade, reflecting very rapidly (and often in anticipation) any tensions that may arise on the physical markets, and the evolution of the supply/demand balance. Speculators play a key role on these markets, providing the liquidity which the hedgers need. Futures markets complement spot markets - they are not substitutes. An efficient delivery system will ensure that the two markets move in tandem, allowing those active on the physical market to use the futures market for anticipatory or offsetting transactions. In practice, most of those active on the spot market are also active on the futures market.

2.2(a) Futures contracts

93. A futures contract is a commercial undertaking between a seller and a buyer to exchange a certain good at a fixed price at a certain future date. This undertaking is met either through the delivery of the goods or through a financially offsetting transaction before the expiration (maturity date) of the contract. Futures contracts are standardized, and are available for different

maturities (e.g. January, March, May, August, October and December of one year, and the same months of the next year). They are also fully fungible; that is, the sale of a May 1998 contract can be offset by the purchase of a May contract (but not by the purchase of a March or an August contract). Standardization and fungibility ensure wide use of these markets, providing a ready market to all those interested in buying or selling. As access to these markets is open to all (or at least, to all those who can put up the required financial guarantees), they fully reflect the anticipations of all actors regarding future market developments.

2.2(b) Options

94. When one buys an option, one has the right, but not the obligation, to make or take delivery (at or before the maturity of the option contract) of a futures contract for a certain commodity at a certain price. Conversely, a seller of an option has the obligation to make or take delivery at this price (called the strike price) if the buyer exercises his right. Options may be compared with insurance, with the buyers taking out insurance (paying a premium), and the sellers acting as insurers. Generally, each option contract has one underlying futures contract, and this standardization allows option markets to be quite liquid (although not as liquid as the underlying futures markets). For buyers of options, the size of their loss is limited to the upfront premium they paid. Sellers have an unlimited loss potential (in practice, most sellers manage these risks through the futures market, using a complicated technique known as delta hedging). One can buy "put" or "floor" options which make it possible to hedge against the risk of price falls, and "call" or "cap" options which provide protection against high prices. The premiums paid or received are determined by the interplay of supply and demand. The costs of strategies using options can be reduced by entering into "collars" or "min-max" transactions, where the costs of the options bought are partly or fully offset by the income from the sale of options; that is, in return for protection against the risks resulting from unfavourable price movements, the possibility of benefiting from eventual favourable price movements is relinquished.

95. Using futures and option markets, or for that matter, swap markets, entails costs - learning costs, organization and telecommunication costs, brokers' commissions (of around 25 cents for each 1,000 barrel contract) and option premiums. Most large companies, however, use these markets quite intensively. In point of fact, not using them also entails costs, i.e. not managing risks means that one is speculating (and not understanding futures markets means one will not be able to negotiate properly - see box 13). Speculation on price movements, the current approach of most African oil exporters and importers, leads to uncertainty about income, problems with managing budgets or investment plans, and difficulties in absorbing fluctuations in foreign exchange income or expenditures.[59]

96. Despite the fact that all African exporting countries use Platt's prices (which are quite close to the prices quoted on the futures exchanges) as the basis prices for their exports, they rarely use the futures market directly. When they use it, it is normally for quite limited

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[59] Some examples of risk management strategies used by Nigeria's NNPC are given in O. A. R. Oladele, "An exporter's experience in oil marketing, risk management and financing", African Oil Trade Conference, Harare, UNCTAD/PTA Bank, April 1996.

purposes. For example, Nigeria's NNPC, through Duke Oil, has used the International Petroleum Exchange (IPE) to fix the differential between the price of nearby contracts and contracts for later months (that is, it locked in desired levels of backwardation). Cameroon's SNH, through traders, uses the IPE in order to extend the period in which prices are fixed.[60] Although limited, the experiences of these companies have been positive.

BOX 13

"BACKWARDATION" ON OIL MARKETS

As can be seen from table 12, prices for nearby contracts on the futures market may be higher than prices for periods further away; in reality they often are (this is called "backwardation").

Table 12

WTI futures prices, New York Mercantile Exchange, 7 June 1996
(US$/barrel)

Month	July	August	October	November	December
Price	20.07	19.22	18.45	18.27	18.15

The reason for this is that refiners prefer to operate only when they have fixed orders for oil products; in fact the limited size of their storage terminals does not allow them to do otherwise. As they also try to keep their crude stocks as low as possible, they therefore tend to buy the crude they need at the last possible moment.

It is important for developing country importers to understand price relations on the futures market, at least if they want to be able to negotiate prices properly. For example, if a country is negotiating in July the import of oil in September, the price basis should not be the July contract, but the lower-priced August contract. It would also seem attractive for importers to try to fix prices as long in advance as possible.

B. Marketing practices in sub-Saharan Africa

B.1 Sales/purchases

97. Sales of crude oil by African parastatals are generally through tender, mostly tenders for term contracts. These tenders are normally won by European companies, which are more familiar with business in Africa and often have better contacts than their American counterparts. This is one of the reasons why African oil is referred to European Brent (in particular, dated Brent), although the bulk of the crude oil produced in the region is for United States refineries.[61]

98. In some cases, governments set a minimum differential, compared to the Brent reference crude, for their tenders. This is particularly the case in Nigeria, where each month the differential is calculated on the basis of product prices (the "deemed processing" technique).

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[60] SNH tries to distribute its sales throughout the year so as to obtain the average price of the year. Where logistical factors make this difficult, the futures market is used to ensure that even if here are no exports during a certain period, a part of exports is nevertheless priced during this period. Obtaining average prices rather than the prices that happen to prevail at the time of physical sales is one of the main uses of futures markets by parastatals and by smaller companies.

[61] Intermediaries can often buy FOB basis Brent in West Africa, and sell basis West Texas Intermediate to American refineries. This gives them interesting possibilities for arbitrage.

NNPC has term contracts with a certain number of traders (over a dozen). When a cargo is available, these traders are contacted for a telephone tender. Although the strongly political dimension of Nigeria's oil business adds some complications, the best bidder normally wins the tender, but is not obliged to take delivery. The crude has to be lifted within three months; if it is not, the bidder is deemed not to be interested and the next one on the list is contacted.

99. NNPC offers additional flexibility to buyers. As has been done in the past (and less successfully) by a few countries exporting copper, NNPC offers its buyers the choice between the payment of the Brent price at loading date plus or minus a differential, or alternatively (against the payment of a premium), the choice of the dates on which prices are determined. Prices can thus be based on prices at the time of loading, or on prices which prevailed at any other time between the signing of the contract and loading. This is called "back pricing". In effect, NNPC sells a complex type of "put" option, earning the premium but taking on the risk that, during the pricing period, prices may turn out to be much below those prevailing at the time of loading.

100. In Angola, marketing is quite well organized, with Sonangol selling most of its crude directly to refiners rather than through traders. The company exports on average nine cargoes every month, of which two are sold on the spot market (the remainder is already allocated under term contracts to traders, refineries and foreign governments). Approximately every 15 days, it issues a tender, and the best bidder wins. In Cameroon, 90 per cent of the crude oil available to the national oil company (SNH) is sold under term contracts, with bilateral price renegotiations on each cargo.[62] In other crude oil producing countries, most oil exports are in the hands of private companies.

101. In summary, term contracts are used for the major part of sub-Saharan oil exports, with a fixed lifting schedule, at prices referring to the Brent price. These term contracts are normally with traders, who then sell the crude on the spot market. An alternative would be for the exporters to sell the crude oil directly on that market; according to one estimate, African exporters could save 5 to 10 cents per barrel if they did so. On the other hand, traders do assume the commercial risk of dealing with these often high-risk countries, and moreover, there is the certainty of sales over a longer period.

102. Oil imports in sub-Saharan Africa are normally effected through long-term contracts or tenders. A typical case, that of Burkina Faso, is discussed in box 14.

B.2 The role of traders

103. In the early 1970s, when crude oil producing countries decided no longer to earn just taxes on oil exports, but to receive their royalties in kind, they had to learn to manage commercial risk and create the proper conditions for their trading operations. Even now, more than 20 years later, many exporters still do not have the necessary trading skills, and need to rely

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[62] This renegotiation is only on the differential - the reference price remains Brent.

on intermediaries, basically traders, to find a market for their crude.

104. In the African context, a trader is a business man (or woman) who tours the different exporting and importing countries with personal and bank references to hand. In sub-Saharan Africa, personal contacts with key decision makers play an essential role in trade relations. In practice, traders will know through their contacts where and when there will be a need for the selling or buying of a cargo. In anticipation of the public announcement of this transaction, traders can then study the market to get a good idea of realistic prices, thus increasing their chances of winning the tender. Once a trader wins the tender, bank documents, mostly a guaranteed irrevocable letter of credit from the buyer's bank, will be exchanged (although letters of credit are often not used for large or well-established companies), and the trader will then charter a tanker so that delivery will take place on time. In the case of exports, the oil is normally loaded only after inspection by accredited experts (for example, those of the Société Générale de Surveillance).

BOX 14

PURCHASING PROCEDURES IN BURKINA FASO

Imports, transport and storage of fuels in Burkina Faso is controlled by the Government through a parastatal oil company called Sonabhy, created in 1985. Sonabhy buys fuels principally through tenders and through a contractual arrangement with the Côte d'Ivoire SIR refinery, in which Burkina Faso holds a 5.4 per cent equity stake. It purchases its butane from the Ghanaian national company, GNPC.

The tenders are for 20,000 to 30,000 MT lots. All offers are made on the basis of average prices of FOB Mediterranean cargoes, basis Italy, as published by Platt's European Marketscan, on the date of initial charging, or on the date of transfer for overland transport. Competition between the various sellers is through the size of the premium, or discount, they offer compared with this FOB reference price.

Source: *Energie et Développement Socio-Economique au Burkina: Projet de Développement du secteur de l'électricité*, 2-5 July 1996; Documents préparatoires, Ministère de l'Energie et des Mines.

105. The main trader in sub-Saharan crude oil is Phibro, an American company which forms part of the huge financial conglomerate Salomons Inc. Phibro is a large integrated oil company, and processes large amounts of crude in its own refineries in the United States. Glencore, based in Switzerland, is the main trader active in the Nigerian market. Vitol and ADDAX, two other European trading houses (both of which conduct a large part of their oil trade through their Swiss offices), also trade large quantities of crude and oil products in sub-Saharan Africa. The traders compete with the trading offices of a number of majors, including British Petroleum (BP), Total (in some countries still operating under its old name of Compagnie Française des Pétroles) and, despite its own share of Nigeria's crude oil production, Shell.

106. Some of the countries in the region have started to follow the example of a number of North African exporters, which have created a marketing structure in the main consumer markets. Although not deeply involved in the distribution sector in Europe or other major markets, countries such as Nigeria and Angola have started to establish trading offices in London.

B.3. Finance

107. The oil industry is highly capital-intensive. This is the case not only for investments[63] but also for the trade itself (a crude oil cargo can easily be valued at over US$ 12 millions). Access to finance, and the cost of this access, are therefore of vital importance for the actors in the industry.

108. For African countries, access to credit is far from easy and thus generally quite expensive, even for countries with huge commodity reserves. Recent financial engineering techniques, however, could help to remedy this problem, at least in part. These techniques use the possibility of linking oil export flows to the loan reimbursements;[64] in a few cases (Nigeria and Angola; in South Africa negotiations were less fruitful), export flows of oil are even used to secure the payments on so-called asset-backed securities. More traditional forms of pre-export finance and import finance are also offered - at a cost - and normally only after certain important guarantees have been given.

109. An interesting example of this type of a financing structure is a loan recently made to Angola by a syndicate of 19 commercial banks, with the Union Bank of Switzerland as the lead arranger. This loan is structured as a US$ 310 million prepayment for oil to be lifted by BP over a three-year period (although to circumvent the negative pledge covenant imposed by the World Bank, which prohibits the State or state entities from pledging any natural resources beyond a one-year period, the transaction was structured in such a way that the loan could be reimbursed within a year).[65] A number of measures to protect against the risks of price falls were built in,[66] and the security thus provided was sufficient to attract into the syndicate banks which would otherwise have found lending to Angola too risky. Angola will pay a low interest rate for this loan: the rate for the first year is only 2.125 per cent above Libor, and 2 per cent for the second and third years.

110. For oil importing countries, the costs of oil imports often absorb a major part of the national hard currency earnings.[67] Borrowing directly from the banking sector is very difficult for these countries, partly because the World Bank's negative pledge covenants make it very

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[63] Elf's investments in sub-Saharan Africa, for example, amounted to some 13,061 million French francs in 1994, or US$ 2.5 billion.

[64] For instance, Angola's Sonangol assigned in 1992 a part of its oil production to the financing of the first major project to develop deep-water production off the coast of Cabinda.

[65] Under the commercial contract between Sonangol and BP Oil International, 30,000 barrels a day of oil will be lifted over a three-year period through shipment of 36 cargoes.

[66] For example, a letter of credit was issued for a total of US$ 434 million, with each of the senior lead managers of the loan taking 10 per cent. Also, some downward price protection was apparently built in, in the form of options.

[67] To give just a few examples, in 1994 imports of crude oil and oil products absorbed 55 per cent of the export earnings of Tanzania, 45 per cent of those of Burkina Faso and Ethiopia, 40 per cent of those of Kenya and 30 per cent of those of Madagascar.

difficult for them to put up the required security for low-cost loans.[68] Nevertheless, although possibilities are limited, countries could for instance link oil import credits to the revenue flows of a major export commodity, as was done in the past by Ghana and Tanzania, for example. Central Banks could also use gold reserves as guarantee. In a recent UNCTAD report, the possibility of creating a Multilateral Guarantee Fund is suggested, so as to facilitate developing countries' acces to risk management and structured financial markets.[69]

C. Domestic oil pricing mechanisms

111. In the majority of countries in sub-Saharan Africa, domestic oil product prices are fixed by the government, often following a set formula. This formula is normally on a cost-plus basis (import costs plus processing, transport and distribution margins, plus taxes), and results in uniform prices throughout the country.[70] The administrative pricing system can be at two different levels: either setting ex-refinery prices (processing cost of the refinery plus crude oil price plus refinery and storage margins), or setting retail prices (ex-refinery price plus distribution and marketing margins, plus various taxes).

112. In most Southern African countries, oil imports come from South Africa and the pricing system used is close to that of South Africa. This system is based on the "in-band landed cost" (IBLC), described in box 15.[71] Changes in this pricing system are being considered in countries such as Namibia.

113. Many countries in the region have started to liberalize oil distribution, for two reasons:

1. When prices are fixed above industrial costs, free rents are given to refiners, paid for by consumers,

2. When prices are below marginal production costs, the refining industry (or the distributors) is in effect subsidizing consumers, which will result in under-investment at potentially great long-term cost.

114. Although many countries revise prices regularly,[72] Zaire is the only country with a

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[68] Since 1991, some exemptions have been granted as regards the negative pledge covenant for major projects in which the commodities to be used as collateral will be produced only as a result of the project. In the oil sector, for example, this has been the case in Russia and Nigeria. However, exemptions are still very hard to obtain.

[69] UNCTAD, *Counterpart and Sovereign Risk Obstacles to Improved Access to Risk Management Markets: Issues Involved, Problems, and Possible Solutions* (TD/B/CN.1/GE.1/3, 2 August 1994).

[70] Some countries, such as Cameroon and Gabon, also maintain a stabilization fund to guarantee uniform prices throughout the country.

[71] For the first time in many years, retail margins were increased in August 1995 to compensate oil companies for higher distribution costs.

[72] Some countries, such as Ghana, Kenya, Uganda, Sierra Leone, Togo and Zaire, regularly adjust the prices of some, but not all, of their oil products.

refinery where both ex-refinery and pump prices are adjusted automatically each month.[73] Lesotho, among those countries without a refinery, has an automatic system with monthly adjustments in deemed import prices and annual adjustments in retail prices. In some countries, certain oil products are taxed, whereas others are subsidized.[74]

BOX 15

IN-BAND LANDED COST

Governments often set domestic oil product prices. The system currently used in South Africa is an interesting example. Each month, product prices are set on the basis of the "in-band landed cost" (IBLC). The IBLC is calculated by taking the average of the spot Singapore prices and the posted Bahrain prices for gas oil and petrol. The prices taken as a reference basis are those of the fifteenth day of each month, as announced by the Caltex refinery in Bahrain, and by the Esso, Singapore Petroleum Company and Mobil refineries in Singapore. Insurance costs (0.2 per cent of the FOB price plus transport costs) and costs of sea transport from these refineries to South Africa are then added (weighted 75 per cent for transport from Singapore, 25 per cent for transport from Bahrain), along with a correction factor for in-transport evaporation, and various taxes. The rand/US$ exchange rate on this fifteenth day of the month is then used to calculate prices in rands.

The resulting prices are deemed to be the production costs of South African refineries, and their sales prices are set as these IBLC prices plus a pre-set profit margin. This system has forced South African refineries to be at least as efficient as their counterparts in Singapore and Bahrain. In many other African countries, however, government-set fixed refining margins removed all incentives for refineries to be efficient.

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[73] But this does not imply that the refinery is made to work competitively: ex-refinery prices are set on a cost-plus basis, leaving a fixed margin, and the refinery is even compensated for the losses it makes on third-party refining.

[74] In Ethiopia, retail prices for LPG and kerosene are set below import costs - in 1995, 23 per cent for LPG and 21 per cent for kerosene. These are in effect cross-subsidies, as petrol is sold at 87 per cent above import cost. One reason this system is maintained is that taxes on fuels contribute a major part (84 per cent in 1995, or US$ 53 million) of indirect government taxes.

PROSPECTS

115. Oil products provide 69 per cent of sub-Saharan Africa's commercial energy needs. In importing countries, they absorb on average about one-third of foreign exchange earnings. For exporters, they generally account for the major part of export earnings. Therefore, oil trade is of vital importance for the region.

116. There are good prospects for a further increase in oil production in sub-Saharan Africa. The potential of many regions is still not fully identified, and even after legal and regulatory incentives have been adopted by many countries, exploration has not yet grown much. Identified reserves could sustain production for some 30 years at the present rate of production. Nevertheless, fields in African countries will be in demand, just like fields in China or the Commonwealth of Independent States, as they will be largely outside OPEC control, and will be needed in view of the probable decrease in North Sea production.

117. The oil industry in sub-Saharan Africa has to grow and become more efficient. Thus, infrastructure needs to be improved, and the remuneration system to actors in the oil sector modified to force them to become more efficient. The present state of infrastructure is very poor: improvements are needed in the technical efficiency of refineries, and in transport, storage and distribution facilities.

118. The way in which domestic prices are determined in most countries, giving fixed, guaranteed profits to refiners and/or distributors, and failing to adjust domestic prices to international ones with sufficient frequency, creates distortions throughout the downstream energy sector. This has led to large financial losses, which in turn have made it difficult to raise the investment funds needed to improve the efficiency of the sector.

119. Apart from stimulating growth and an improvement in efficiency, countries should maximize the contribution that the sector can make to the national economy (or minimize the costs of oil imports for the national economy) by improving marketing and financing techniques. Given the capital-intensive nature of the oil industry, the importance of oil trade in the balance of payments of States in the region, the dependence of different countries on oil imports in the absence of alternative energy resources (a dependence which will grow with the growth of national economies), and the great volatility of international oil prices, it is imperative at least to try to use some of the new marketing and financing techniques which have proved their value in other parts of the world. For this, well-trained professionals are needed.

120. The way in which oil is traded has changed profoundly over the past decade, and the resulting market structure is indeed complex. However, there is no reason to believe sub-Saharan countries are incapable of adapting to these new conditions, so as to make full use of all the possibilities now available. However, to do so, institutional reforms will be necessary, policies need to be modified, and an effort needs to be made to build up the skills and the operational systems needed in today's oil trade.

121. Access to credit has to be facilitated so that risk management instruments can be used; and use of these can make access to credit easier. The vicious circle of lack of credit-lack of

improvements in efficiency-large risks-lack of access to credit can be broken by using these modern financial techniques, including in hybrid forms, e.g. combined with stabilization funds.

122. The key to success has less to do with the state control versus liberalization debate than with the will of policy makers to adopt sound managerial systems and practices. Africa's functioning in the world oil economy has so far been largely passive, not for any fundamental reasons but because governments have (perhaps by default) opted for a passive role. If the continent wants to take its economic performance into its own hands, it will be necessary for practices in the oil sector, which is of primordial importance for the region, to be put on a new footing - and more sophisticated marketing, risk management and financing techniques will play a major role in this.

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